7: Story
137

FX10 Bushmen FX10

/Because this entire source is essentially a botanical report on the flora of the Bushmen region, data on flora will be found in category 116, pp. 4-8, 10-113/

UNION OF SOUTH AFRICA

DEPARTMENT OF AGRICULTURE
DIVISION OF BOTANY

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Some Plants Used by the Bushmen in Obtaining Food and Water

BY

R. STORY, D.Sc.
DIVISION OF BOTANY, PRETORIA.

1958

[TITLE PAGE]

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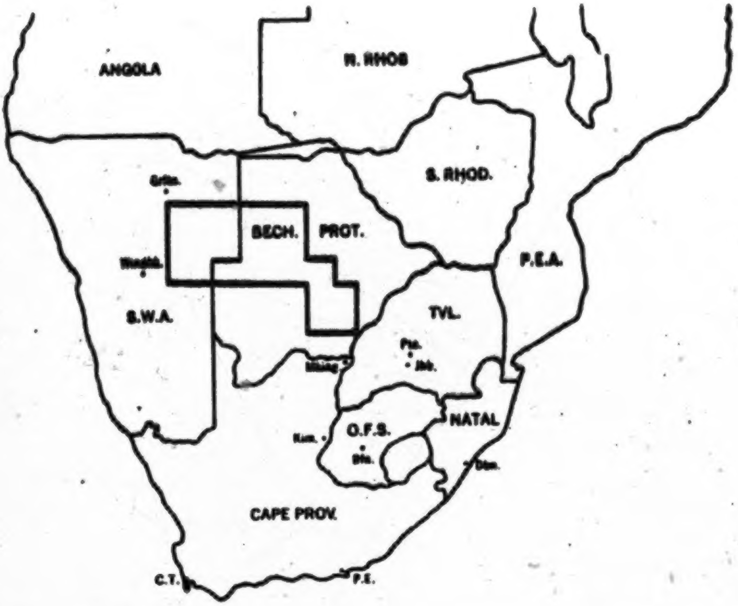
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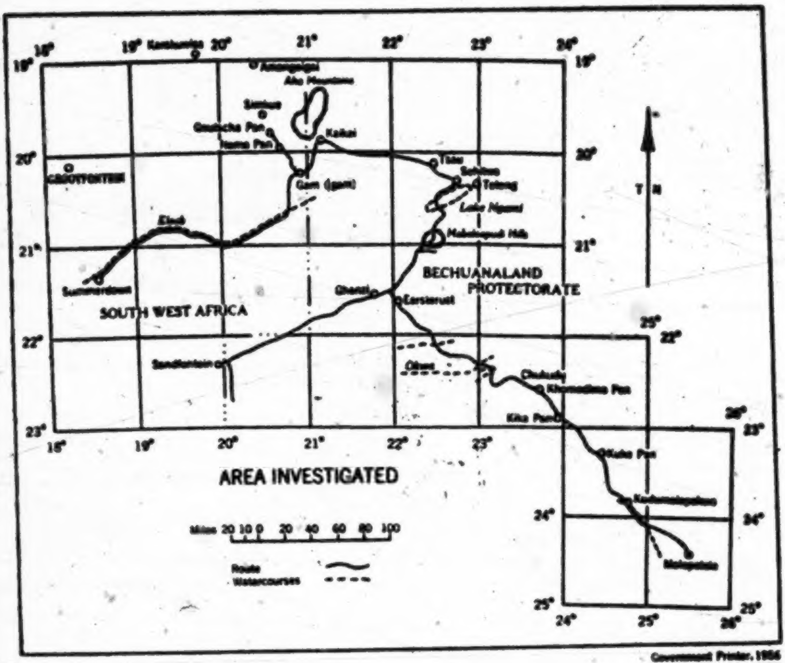
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Summerdown
Ghanzi
Eersterust
BECHUANALAND PROTECTORATE
SOUTH WEST AFRICA
Sandfontein
Okwa
Khomodimo Pan
Kika Pan
Kuke Pan
Molepolole
T N
AREA INVESTIGATED
Miles 20 10 0 20 40 60 80 100
Route
Watercourses

Government Printer, 1956
Staatsdrukker, 1956

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133

GENERAL AND DETAILED MAPS
OF THE AREA COVERED IN THIS STUDY.

FOREWORD.

X137 The Kalahari is not a sandy desert in the sense that it is devoid of
312 vegetation; it is the absence of surface water which makes the region such
a hazard to human habitation. It is the last refuge of the Bushman.
151 Primitive though he is, he survived in this inhospitable environment
owing to his acute powers of perception and his fine appreciation of the
224 gifts of nature. He is a skilled hunter with his bow and arrow and has an
823 intimate knowledge of the natural resources of food and water. Dr. Story
124 compliments him by saying that his knowledge was usually imparted
cheerfully and with humour and "always with intelligence".

121 The Division of Botany was grateful to accept the invitation for Dr. Story to accompany the Harvard-Smithsonian-Peabody expedition of 1955. This was the fifth expedition of its kind and had as its objective the further documentation of the way of life of the Bushman. Dr. Story's assignment was to investigate the plants used by them in obtaining food and water.

It is inevitable that, with the advance of civilisation, the remnants of this interesting race will lose its intimate contact with nature and in the end its very identity. Wishing to complete their records before this happens the Harvard-Smithsonian-Peabody organisation, is, as we go to press, returning on yet another expedition. The Division of Botany is glad of this opportunity to continue the collection of data on the plants of economic importance to the Bushmen in the Kalahari.

The balance in nature between supply and demand is of endless
interest to the ecologist. In times of plenty—when vegetation is abundant
—the animal population increases: in times of poverty—when the vegeta-
tion is reduced by the prevailing climatic conditions—the animal popula-
tion is reduced by the effects of hunger and thirst. So it is with the primi-
tive human, who is dependent for his survival on the animal and plant life
which surrounds him. Overpopulation at any time spells destruction for
him at a later date. It is obvious too, that primitive man must have had
a strong influence on the distribution and density of edible wild plants.
Some will have become more widespread and others less numerous. More
XC137 and more examples of rare species among the tuberous rooted *Asclepia-*
daceae have come to light during the botanical exploration of southern
Africa. It is felt that the edibility of these and some other tuberous rooted
plants, in a large measure, accounts for their sparse distribution.

Dr. Story's observations support this view, and many other interesting facts are recorded in his preliminary report on the vegetable aspect of the Bushman's diet.

R. A. Dyer,
Chief: Division of Botany and
Director of Botanical Survey.

Pretoria,
October, 1957.

INTRODUCTION.

Early in 1955 the Chief of the Union Government Division of Botany 121
received a request through the British Museum for a botanist to accompany the Harvard-Smithsonian-Peabody expedition, which in the winter of that year was to make a study of the Bushmen of the Bechuanaland Protectorate and South West Africa. The duties of the botanist would be to investigate and report upon the plants used by the Bushmen in obtaining food and drink, and this task was assigned to me in my capacity as one of the Botanical Survey Officers of the Division of Botany.

I joined the expedition on 10th June at Molepolole, after it had been 122
some weeks in the field, and we thereafter travelled along the route shown on the map, reaching Windhoek on 2nd September.

There were two main areas of study, one in the country south of 133
Ghanzi and the other north of Ghanzi. The southern area, part of the
Kalahari Desert, was remarkably uniform in every way. The surface [134]
was deep loose sand, gently undulating and with occasional shallow
depressions of firm dark soil known as pans, which collect a little water
after rain. We did not see a hill after leaving Molepolole until the
Ghanzi area was reached, nor a stone, except for shelves of limestone in
some of the pans. There was no permanent water in the 300 miles between [312]
Kudumalapshwe and the Ghanzi farms, but Khungwane waterhole and
Khomodimo Pan had not yet dried up. Khungwane held one or two
thousand gallons and Khomodimo contained a pond about thirty yards
across and a foot or so deep. It provided a home, rather unexpectedly, [136]
for a coot (*Fulica cristata*) and a water-scorpion (one of the *Nepidae*).
There are no records of the central Kalahari rainfall, but it would be [132]
between 18·5 and 19·6 inches, which are the mean annual figures for
Ghanzi and Molepolole respectively. In spite of this low rainfall, and
although we were there in the dry season, we found that the sand a few
inches below the surface and down to at least three feet was damp enough
to retain its form when squeezed in the hand. One specimen of a species 136
of Breviceps was found in the sand, a small burrowing frog which does
not swim or jump and which passes through its tadpole stage in a mass
of frothy material which surrounds the eggs. The commonest animals were
the rodents whose burrows and tracks were in thousands along our route.
The game included gemsbok, springbok, hartebees, eland, blue wildebees,
giraffe and smaller antelopes and hares. Of the carnivora, lions, leopards,
wild dogs, jackals and hyaenas were present. Ostriches and bustards were
seen and occasional small birds of various species, but birds were on the
whole poorly represented. The vegetation was mainly grassland, usually 137x
about four feet tall and mixed with many shrubs a little taller. Trees were
seldom absent for more than a few miles at a stretch, and were scattered
to form a parkland or in belts thick enough to hamper the progress of our
lorries through them.

The northern area was much more varied, with the undulations 133
sometimes forming distinct rises and dales. Hills, however, were still
absent, although there were occasional outcrops of limestone and other
rock. The soils were for the most part fairly firm, but sandy nevertheless, [134]
and damp below the surface. From time to time we crossed zones of
purer loose sand, slightly raised above the surrounding country and known
as dunes. A number of permanent waterholes, groups of large pans and a
rainfall estimated to be about 20 inches a year (Department of Transport [132]
1953) made this area better watered than the Kalahari, and better wooded. 137x

X137 There were more species of grass, and, particularly on the dunes, more of 136 trees and shrubs. The fauna was also richer for there were buffalo and elephant and many waterfowl in addition to the animals found in the Kalahari.

197 The Bushman languages represented in this paper are classified [128] according to Bleek's *Comparative Vocabularies of Bushman Languages* (1929). They are !hɔ:, the closely interrelated ||ganakwe, |gikwe and Naron, and Auen (see also Bleek, 1928: 60-64).

!hɔ: is a member of the southern group, in which the lip click is found, and a dialect of what Bleek calls |nu||en, S6 in her system of [194] classification. Bleek's spelling is !kɔ:, but I heard the click aspirated. It is spoken in the neighbourhood of Lehututu, which is 150 miles south of Ghanzi.

||ganakwe is spoken to the east of Ghanzi, and has been studied by Maingard (1957).

The centre of the |gikwe language appears to be in the country to the south-east of Ghanzi. It is a member of Bleek's Central group, closely allied to Naron and easily understood by Naron speakers although many [194] words are different. A curious feature of the phonetics is the occurrence of the ejective lateral explosive followed immediately by the velar glottal affricate (see Cole, 1955: 23 and Beach 1938: 222-223). The first sound is not mentioned in any papers that I have seen on the Bushman languages.

[114] Naron is Bleek's C2. There is an error which is liable to confuse one on page 3 of her publication, where the languages of the Naron and Masarwa of Tati have been transposed. Naron should be under C2 and the Masarwa language under C1. A grammatical sketch of Naron is given in Bleek's paper of 1928.

Auen, Bleek's N1, is the eastern form of the !khû linguistic group and is spoken round Gautscha Pan. It was studied by Maingard when he was a member of this same expedition and an account of it is given in his paper of 1957. In this paper I refer to it as Eastern !khû.

124 The work done in the Kalahari was done through interpreters, and much of that in the northern area likewise, except towards the end of the expedition when through closer contact with the Bushmen for a longer time than in the south, I was able to acquire a smattering of the Eastern !khû language, enough to ask straightforward questions and to understand straightforward replies. The phonetics of the Bushman languages are a study in themselves, and I do not claim that my spellings and indications 104 of the tones are exact. In the orthography I have followed Bleek (1929) 194 with the following exceptions:—

1. I have placed the n first when it is combined with a click. It has been the convention to place the n after the click in the written Khoisan languages, the argument being that the n and the click are pronounced simultaneously (Meinhof, 1909: 5). To my ear the n is the first sound in the combination.
2. Bleek does not mention the voiced h, which sometimes follows a nasalised click. I have accordingly followed Doke (1936: 448) and used the symbol ɦ.

For easy reference, the symbols I have used are listed at the end of this introductory chapter.

As the spellings of the Bushman names on my herbarium specimens 128
are from field notes, they are often different from the spellings given in this paper, which was done after I had had the opportunity of consulting the authors I have mentioned. It will be noticed that many of the plants do not have the full set of Bushman names. The main reason is that we were not in contact with the Eastern !khũ speakers until we had passed Ghanzi, and lost contact successively with the |gikwe, ||ganakwe and !hɔ̃: speakers as the expedition drew to a close. Other reasons are that my field notes were sometimes inadequate, that I forgot to ask, and that some [184]
plants appeared restricted to certain areas and were not known to all the groups of Bushmen.

As the expedition was during the winter when most of the plants were 126
in poor condition, very little photography was done in the field. Most of the photographs are from plants which were sent back to Pretoria and cultivated there, or from plants which grow naturally in the Transvaal. In [128]
this paper the plants and photographs are arranged according to de Dalla Torre and Harms (1900-1907). Specimen numbers are in brackets.

There is little doubt that the plants discussed here represent only a 114
fraction of those used, for we covered a very small part of the area over which the Bushmen range, and this when probably most of the annuals were dead, when some foods were out of season and when the above ground parts of many bulbous and tuberous plants had withered and disappeared so that the plants themselves could not be found.

Because of poor yield, poor quality, difficulty in harvesting or lack of 000
flavour, not many of the Bushman food plants would be worth cultivating in their present form for the use of civilised people, but they offer a large field to the plant breeder. The most promising have been noted accordingly in the text.

There were few bones around the Bushman encampments, but this 262
does not necessarily mean that there is a scarcity of meat in their diet, for the bones might have been removed by porcupines (Alexander, 1956; Dart, 1957) or eaten by hyaenas. A more reliable indication was the [291]
scantiness of the Bushmen's skin coverings. There are sharp frosts in the [132]
Kalahari and sometimes bitter winds, and one may argue that the Bushmen would provide themselves with sufficient skins if they had a regular supply of meat, although admittedly they eat skins after charring them on the coals and pounding them in a mortar. Vegetable refuse from former meals and fresh vegetable food, however, were found at all the Bushman encampments, and additional gatherings were the permanent chore of the women and children and of the men to a lesser degree. The insanitary condition of the surroundings also provided unmistakable [364]
evidence that the bulk of their food was of vegetable origin.

Their knowledge of field botany was astonishingly good. It has to 824
be, otherwise they would have no chance of survival in their arid country. Fragments of stem, dead leaves, and other small clues of this nature, after being unerringly identified, were all the Bushmen needed to find many of the storage organs they were seeking. Differences which escaped me would enable them to distinguish between edible and harmful plants, and they had a thorough knowledge of the areas and habitats in which their food plants grew. They must have an influence on the distribution of plants, 137X

137 spreading some like the Grewias and the melons whose seeds pass through the alimentary canal apparently unharmed and reducing others like the Eulophias and Vignas which have edible underground storage organs. It is perhaps significant that, with two exceptions, the edible members of the family Asclepiadaceae were rarely found. In this paper there are 11, from Raphionacme to Fockea inclusive—nearly all important food plants with underground storage organs. The two commoner exceptions were *Sarcostemma viminale* which is sometimes poisonous and *Pentarrhinum insipidum* which has edible leaves and fruits but an inedible perennial root.

146 I am not qualified to speak on the health of the Bushmen, but it is apparent even to the layman that they are very unlikely to suffer from any deficiency disease while on their natural diet. When they are recruited for labour and fed on an unbalanced diet their health will be undermined and they will be less able to resist the rigours of their normal life when their contracts expire.

114 Their study by serious workers is to be encouraged for it should lead to their stability as a race and the enrichment of our knowledge, but contacts with irresponsible strangers is unfortunate and observations like the following by Brown (1954: 130) are valueless and regrettable:—

> "They are wonderful runners. When I chased one with the clanging of a bell he set off at a good bat into the distance, and kept it up until out of sight."

122 During the three months in which the field work was done, the expenses of my transport and keep were met from the funds of the expedition, and this I gratefully acknowledge. Dr. R. A. Dyer, Chief of the Division of Botany, gave me the opportunity of joining the expedition, and all facilities for working up the results of the field work. Most of the determinations were done by my colleagues in the Division of Botany, and of them Miss I. C. Verdoorn, author of *Edible Wild Fruits of the Transvaal*, read through the typescript and gave me valuable advice. Dr. L. E. Codd deserves special thanks for the way he saw to the growing of the considerable quantities of roots, bulbs and seeds sent from the Kalahari.
000 I thank Mr. L. K. Marshall, who led the expedition, and the members of it,
[15] for their interest and kindness, also Kernel Ledimo, a fluent speaker of the Eastern !khũ language, who was always ready to translate or to pilot me through its little-known and fascinating grammar and phonetics. My notes on the Bushman languages were kindly checked by Prof. L. F. Maingard, and the ethnological literature was supplied mainly by Dr. N. J. van Warmelo of the Department of Native Affairs. I am indebted to Messrs. Midgeley, Martin and Scholtz of the Bechuanaland Administration for hospitality and for enabling me to see parts of the territory that I should not otherwise have seen. My thanks would not be complete without mention of the Bushmen whose knowledge is the foundation of this paper.
[124] The information was seldom reluctantly given—usually cheerfully and with humour, and always with intelligence.

ORTHOGRAPHY.

The following are the approximate values of the letters and symbols used in the spelling of the Bushman names. They have been taken from Bleek's paper of 1929, pages 12-14.

104
194

b d h k l m n r s w z	as in English.
kʼ tʼ	as above, but with glottal closure.
ɡ	as in *g*et.
j	as in *y*et.
kʼ	the velar glottal affricate.
x	as German *ch*.
ŋ	as in si*ng*.
ʃ	as in *sh*ip.
ʒ	as in vi*s*ion.
ɽ	the flapped retroflex consonant.
|	the dental click.
!	the palato-alveolar click.
||	the lateral click.
ǂ	the alveolar click.
ʘ	the lip click.
a:	as in h*a*rd.
a	the same sound shortened.
ɑ	the same sound produced far back in the throat.
e	as in *ai*r.
e:	as in s*ay*.
ɛ	as in m*e*t.
i	as in h*i*t.
i:	as in m*e*.
ɔ:	as in h*au*l.
ɔ	the same sound shortened.
o	as in n*o*tice.
u	as in p*u*t.
ʔ	the glottal stop.
~	over a letter denotes nasal pronunciation.
ʼ	over a letter denotes accentuation of the syllable.

The middle tone is not marked, the high tone is marked by a dash above the line preceding the syllable, the low tone by one below the line, as ¯ha, _ha; rising and falling tones are marked ˊha and ˏha.

The voiced h is written ɦ.

SYNOPSIS AND DESCRIPTIONS.

128 The synopsis is intended as a guide only, and leads to groups of plants and usually not to species. The descriptions and photographs should make the final identification possible, but it should be remembered that there are many Bushman food plants which were not seen on the expedition and which are therefore not described in this paper.

I have taken for granted that the reader will realise that the measurements of plants and their organs vary, and for this reason I have usually given what I consider to be the average and have omitted most words like "approximately" and "about".

Technical terms have been avoided except for the following:—

Axil of leaf—the angle between the leaf and the stem;
glabrous—without hairs;
glaucous—bluish-green, or covered with a bloom;
pappus—a tuft of hairs on a seed;
perianth—petals and sepals;
rhizome—an underground stem;
tomentum—dense short hairs;
tuber—a roundish succulent underground stem.

UNDERGROUND PARTS EDIBLE.

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Trees or shrubs	*Bauhinia macrantha.* *Boscia albitrunca.* *Commiphora* spp.
Prostrate runners	*Bauhinia esculenta.* *Cucumis* sp.
Climbers or scramblers:—	
Scramblers	*Ipomoea verbascoidea.*
Twiners	*Ceropegia* spp.
With tendrils	*Coccinia* spp. *Corallocarpus welwitschii.*
Fleshy finger-like angled erect stems	*Caralluma knobelii.* *Duvalia polita.* *Stapelia kwebensis*
Without chlorophyll	*Hydnora* sp. *Terfezia* sp
Wiry 12" stems	*Ipomoea* sp. *Raphionacme burkei.*
Monocotyledons (strap-shaped or grass-like leaves):—	
Bulb with papery coverings	*Dipcadi* sp. *Mariscus congestus.* *Scilla* sp.
Rounded storage organ without papery coverings	*Eulophia* spp. *Walleria* sp.
Horizontal rhizome	*Sansevieria scabrifolia.* *Typha capensis.*

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ABOVE-GROUND PARTS EDIBLE.

Trees shrubs or palms:—	
Thorny or spiny—	
Large fruits more than 1½″ in diameter	*Hyphaene ventricosa.* *Strychnos* spp.
Small fruits less than 1½″ in diameter	*Commiphora pyracanthoides.* *Ximenia* spp. *Ziziphus mucronata.*
Pods	*Acacia* spp.
Not thorny or spiny—	
Leaves compound—	
Stems more than 2′ thick	*Adansonia digitata.* *Ricinodendron rautanenii.*
Stems less than 2′ thick	*Burkea africana.* *Lannea edulis.* *Rhus commiphoroides.* *Sclerocarya caffra.*
Leaves simple—	
Fruits winged	*Combretum* spp. *Terminalia sericea.*
Fruits not winged—	
Leaves bilobed	*Bauhinia macrantha.*
Leaves not bilobed—	
Leaves hairy	*Dichapetalum cymosum.* *Ehretia rigida.* *Grewia* spp. *Royena sericea.* *Strychnos cocculoides.*
Leaves glabrous	*Boscia albitrunca.* *Ochna pulchra.*
Prostrate runners—	
Stems and leaves fleshy	*Talinum arnotii.*
Leaves bilobed	*Bauhinia esculenta.*
Fruits spiky	*Citrullus naudinianus.* *Cucumis hookeri.* *Momordica balsamina.*
Fruits smooth	*Citrullus vulgaris.*
Climbers or scramblers—	
No tendrils	*Pentarrhinum insipidum.* *Pollichia campestris.* *Sarcostemma viminale.*
Tendrils—	
Fruits spiky	*Cucumis metuliferus.* *Momordica balsamina.*
Fruits smooth	*Coccinia* spp. *Corallocarpus* spp.
Fleshy finger-like angled erect stems	*Caralluma knobelii.* *Duvalia polita.* *Stapelia kwebensis.*
Fleshy slender round erect stems	*Sarcostemma viminale.* *Talinum arnotii.*
Slender lax stems about 1′ high	*Pollichia campestris.*
Stemless, with one soft leaf	*Ophioglossum sarcophyllum.*
Monocotyledons (strap-shaped leaves or fleshy leaves with spiny margin)	*Dipcadi* sp. *Aloe* spp. *Typha capensis.*

X137 *Terfezia* spp. (5031, 5616) Photograph 1.

Naron Bushman......	,ku-ts'ɪ
Eastern !khû Bushman	,tsu-ts'ɔ

In size, shape and colour these truffles resemble potatoes, but the skin is rough and they are not as heavy.

The genus Terfezia, which is allied to the European truffles, has been recorded from dry and sandy localities between the northern Cape Province and the Mediterranean region. There are 36 species, of which three are believed to occur in South West Africa and the Union. Some records are vague and incomplete, and cannot be checked. These southern species, all of which are edible, are not distinguishable except by microscopical examination. They may be found from April onwards to about July, when the season ends presumably through their disintergrating in the soil. Their presence depends upon the rainfall, as is shown by the following extract from a letter from Mr. G. Scholtz, of Ghanzi, whom I had asked to collect some for me. "Nature appears to be against you this year. I even offered five shillings per truffle, but according to the Bushmen (my offer was just laughed at) no rain, no truffles. And we certainly have had no rain, in fact the worst drought in Ghanzi's history."

It is uncertain whether they are root parasites or mycorrhizal fungi, and nothing definite is known as to the host plant favoured by any particular species. In the south-western Kalahari, near the Kalahari Gemsbok National Park, they are found in the dips between the sand dunes where *Aristida ciliata* is the dominant grass, but it has not yet been established whether they are connected with it or with some associated plant. Towards the Ghanzi area they were collected in a mixed grassveld of Aristida and Eragrostis species with scattered trees of *Acacia uncinata* and no *Aristida ciliata;* but here another species may have been involved.

222 The European truffles are usually collected with the aid of dogs or pigs, which can trace them by their scent, and rarely by two other methods. One of these is by observing where certain insects collect to lay their eggs, for their larvae feed on truffles and the eggs are laid near them. The other is to watch for cracks in the ground which the truffle sometimes causes as it grows. This is the method used in southern Africa. A good deal of practice is needed before it can be applied, for the cracks are slight, and are specially difficult to find where the surface has been disturbed by game or stock, or where they have been partly filled in by windblown sand, but matters are eased somewhat by the fact that there is seldom more than about three inches of sand covering the truffles and that they grow in patches.

252
262 They may be eaten boiled or roasted. The texture is like soft cheese. They are not aromatic and the flavour is far inferior to that of the best European truffles.

Ophioglossum sarcophyllum Desv. (5142) Photograph 2.

X137 This unusual looking plant is one of the ferns. It is five inches high on the average, and somewhat fleshy, and consists of an erect stalk with a leaf-like undivided frond at the top. A thinner stalk which bears the spores rises from the mid-rib near the base of this frond.

A few specimens were collected at Gam, on damp sand which was moist from the run-off from adjacent rock outcrops. It is usually found in places like this, where the dampness is conserved, but after good rains its distribution is not restricted, except that it occurs more in the open and does not grow under dense bush. In favourable localities it is sometimes massed, and may be collected in quantity. It occurs throughout southern Africa. 137X

It is used by various Native tribes as a spinach, and may also be eaten raw. It tastes like lettuce but is slightly sweeter and lacks the crisp texture of lettuce. 262

Typha capensis Rohr. (5302) Photograph 3.

Eastern !khû Bushman dza-dza

A cosmopolitan and well-known plant, known in South Africa as the bull-rush, and easily recognisable from its inflorescence which forms a compact brown spike two feet or more in length at the tops of the five-foot flowering culms. This is in two parts, variously divided so that the lower may be equal to the upper, or shorter, or longer. The lower part consists of the female flowers and is sausage-shaped and brown, with the flowering culm running through its centre. Immediately above this is a spike of male flowers, similar except that it is more open and often yellowish from the masses of pollen it contains. The leaves are strap-shaped, usually an inch wide and six feet long, erect and fairly rigid and very slightly twisted along their length. It is a gregarious plant and always grows near water. 137X

A little was growing round a permanent spring at the edge of Gautscha Pan, and was the only patch seen during the trip.

The top (male) part of the inflorescence is eaten raw by the Bushmen. It has the rich and familiar flavour of bee-bread. Dinter (1912:17) states that the rhizome of this plant is the thickness of one's finger and about two feet long, and may after drying and husking be beaten to a reddish meal which is rich in starch and may be used in the same way as meal from cereals. I have tried the rhizome myself. It is heavy and succulent when fresh, and loses water slowly. When dry it has a puffy outer zone of tissue which may be stripped off to expose a hard central cylinder containing the reddish starch to which Dinter refers. As the starch does not crumble readily it is difficult to beat out, and it is full of fibres which may however easily be removed by sifting. It may be boiled to make a brown porridge of good quality except that it is more glutinous than any porridge normally used by us. 252 262

137X

Mariscus congestus C. B. Cl. (5166) Photograph 4.

Naron Bushman...... n!ani
Eastern !khû Bushman !gewu

This plant is one of the sedges, a group closely related and similar to the grasses but distinguishable by certain rather subtle differences which most laymen as well as botanists are familiar with. One of the main ones is that their flowering stalks are usually three-angled and solid while those of the grasses are usually round and hollow. The species in question could not, in its withered winter condition, be named in the field, but bulbs which were collected grew well in cultivation and flowered in Pretoria that same

X137 year. They produce an erect and robust plant with bright green leaves and numerous spreading underground rhizomes on which more bulbs are borne a few inches below the surface. Some stolons are produced above ground as well, from among the leaves. They afterwards turn downwards, entering the soil close to the parent plant and thereafter behaving in all respects like the rhizomes. The flowering stalk is three-angled and unjointed, with a cluster of compact, spiky inflorescences at the top, some on slender secondary stalks and some almost sessile. The parent plant is in a sense annual, for both it and the bulb producing it wither at the onset of winter, but the fresh bulbs which have been produced form new plants, and the species is capable of spreading very rapidly by this means. The bulbs are rounded, half an inch in diameter with a sharp point at the top, and covered with several papery brown layers which may be removed to expose a pale nut-like body.

Sedges usually favour damp places, but this species seemed equally at home in seepy areas and well-drained ones, and in the sandy country near Nama Pan it was common nearly everywhere, sometimes scattered among the grasses but more often in patches. Its range is from Cape Town to the Mediterranean, and it occurs in Australia also.

262 The bulbs are edible, and seemed to be a fairly important food of
the northern Bushmen. The taste is sweetish and they have a crisp tex-
252 ture and a cloudy, very slightly astringent juice. Light roasting improves
222 the flavour. They are easily gathered by scratching away the top layer
of soil, and their presence is often shown by the disturbed soil where they grow, for they are a favourite food with many birds and small animals, which scratch and burrow to find them. According to the *Flora Capensis* the plant "has been for nearly a century cultivated in Europe".

X137 *Hyphaene ventricosa* Kirk (5301).

Eastern !khũ Bushman !hani and !heni

This palm is bushy when young, but loses its bushy habit as it matures, forming a long clean stem 40 feet in height with a crown of leaves at the top and often with a slight swelling near the middle. The leaf has a strong woody rhachis up to six feet long, slightly hollowed above and rounded below, with a row of sharp hooked spines at intervals of an inch or so along each margin. At its tip it bears the leafy part which is two feet across and folded like a fan. The fruits, a little smaller than a tennis-ball, are covered with a glossy brown papery skin, and are borne in clusters.

Old an half-decayed fruits were found in the neighbourhood of Nama Pan, presumably where they had been discarded by Bushmen, but the palm trees themselves were not seen in this area. Only one specimen was found, 20 miles to the north-east. It was immature and had neither flowers nor fruits. According to available records, it was growing near the southern limit of its range, which extends to northern Rhodesia and the Belgian Congo.

262 There is a quarter-inch edible mealy layer immediately underlying the
114 skin of the fruit. It is fibrous and dry but sweetish, with a pleasant
flavour, and may be gnawed off the hard inner shell into which it merges.
[272] The kernel in the centre of the mature fruit is hard and bony and inedible,
[252] but Chapman (1868: II: 73) states that the milk of the young fruit may be
used like that of the coconut, and that the whole of the young fruit may
be eaten after boiling, "pulp, rind, and all."

be eaten after boiling, "pulp, rind and all". Dinter (1912:21-22) says 262
also that the Bushmen use the heart of the palm as a green vegetable, and 114
that a sweet sap may be tapped from the upper part of the stem and [273]
fermented to make an alcoholic drink. He gives the yield of fruits from one palm as between 20 and 50 kilograms (48 to 120 lb.). His reference to the heart of the palm is obscure, but Chapman (1868:I:55-56), who is more explicit, says that this is the core of the young trunk.

Aloe rubrolutea Schinz (5135). 137X

Eastern !khũ Bushman n||ɔru

This species was in full bloom in early August, and made a striking show with its spikes of brick-red flowers. The plants formed rosettes of leaves 12 inches across, producing a slender erect five-foot flowering stalk. Among the hundreds of speciments seen there were none arborescent, although elsewhere arborescent forms are common (Reynolds 1950: 328). Those seen at Nama Pan were similar in habit to *Aloe zebrina*.

Aloe rubrolutea was seen only on the rocky outcrops near Nama Pan and Gam, growing in patches of an acre or so, but it has a wide distribution extending from South West Africa through the Bechuanaland Protectorate to the northern Transvaal and Portuguese East Africa.

The flowers are stripped off the flowering stalk and pounded to make a 252
spinach-like vegetable. Although the Bushmen said that they did not eat 262
the leaves, they were tasted raw and boiled and were found to be juicy and not unpleasant, and to have no harmful effects. They would be a good source of water in an emergency.

Aloe zebrina Bak. (4995). 137X

!hɔ̃: Bushman.....	||ganja
||ganakwe Bushman	n||ɔru
|gikwe Bushman...	n||uru
Naron Bushman...	n||ɔru

The plant forms a rosette of rigid dark green leaves which have pale transverse bands and numerous sharp teeth along the margins. It may have a stem 30 centimetres long (Reynolds, 1950: 282), but those seen on the expedition were stemless. The flowering stalks were three or four feet high. The sap in the epidermis of the leaves is greenish-yellow. It oozes out of the vessels fairly quickly if a leaf is cut across, and hardens and changes colour on exposure to the air, becoming brown and glassy. The bulk of the sap, which is in the inner part of the leaf, is colourless and translucent, and does not ooze out if the leaf is cut.

Only one small clump of this Aloe was seen, on deep sand about 80 miles directly south-east of Ghanzi. It is, however, recorded from Angola and South West Africa and across the continent to the east.

The Bushmen stated that the leaves were a good source of water. One 262
of these plants was sent to Pretoria and grew well in cultivation. On being 312
tested, the leaves proved extremely unpleasant, not because of any bad 824
taste but because their sap is in the form of a thick, revolting slime. Boiling or roasting did nothing towards making them more palatable. Either the Bushmen were confusing this Aloe with another species, or it

262 is eaten only when they are in the greatest need. Reynolds (1950: 285),
271 quoting W. B. Hooker, states that its flowers may be eaten after boiling,
824 but I did not think of asking the Bushmen about this; and they did not
[114] volunteer any information.

X137 *Dipcadi* sp. (5163, 5307).

!hɔ̃: Bushman........	n!ɦɔm
Naron Bushman......	n!ɔm
Eastern !khũ Bushman	n!umʃé:

Although the above-ground parts had been killed by frost, enough remained for the plant to be identified as a species of Dipcadi. The bulbs were two inches below the surface of the soil, in appearance like a small onion. They were planted in Pretoria, but although they were still alive two years after being collected, they had failed to produce leaves or flowers up to the time this report was written.

Specimens were collected at Nama Pan, in parkland on sandy soil. As the plant was recognised and named by one of the southern !hɔ̃: Bushmen who was with us, it probably extends into the Kalahari well south of Ghanzi.

[262] The bulbs are edible after cooking.

Scilla sp. near *Scilla lancifolia* Bak. (5190) Photograph 5.

Eastern !khũ Bushman	tũ

This plant has a rounded two-inch bulb covered with a thick layer of dark brown papery scales. In the summer it produces three or four spreading leaves, usually six inches long but up to 10, and one and a half inches wide at the widest part. They are thin but fleshy, strap-shaped (but in section widely V-shaped near the base), and light green, sometimes faintly mottled with darker green. The inflorescence is four inches long and the flowers small and not conspicuous, with purple stamens and a recurved perianth.

It was common in shallow sand overlying rock near Gautscha Pan and Nama Pan but was not easy to find because the leaves and inflorescences had been frosted, and blown away by the wind by the time the expedition had reached those parts. A number of bulbs collected there produced leaves and flowers in Pretoria the following summer, and it was from these plants that the notes were made.

[252
262] The bulb is edible after roasting but I have not tried it personally.

It would be dangerous to experiment with plants like this if what the Bushmen say is true, for it could be easily confused with another species which has an inedible bulb. The inedible species (No. 5181) is shown in photograph 6 and may be distinguished by its longer bulb and longer leaves (10 inches long and over, and two inches wide at the widest part). They have a translucent fringed margin, are pointed, narrowly V-shaped in section and more numerous, about 12 to a plant. In addition, the older leaves are marked at the base on the lower surface with narrow 137x wavy black bands. Specimens were collected in sandy soil in open parkland near Nama Pan and flowered in Pretoria the following summer. The leaves and inflorescences, like those of the edible species, die back during the winter.

Neither of the two species could be named in the National Herbarium, for the genus is not well documented and badly in need of revision.

Sansevieria scabrifolia Dinter (4951) Photograph 7.

!hɔ̃: Bushman........	ǂxa-ji
ǁganakwe Bushman...	!gwi:
|gikwe Bushman......	!gwi:
Naron Bushman......	!gwi:
Eastern !khũ Bushman	!hwi:

A stemless plant with bunches of stiff, erect, strap-like leaves 10 inches long and a little less than an inch wide, concave on the front or upper surface and rounded on the back, and without a midrib. They rise at intervals of a foot or so, and in tufts of up to a dozen, from a brown-skinned horizontal rhizome three inches below the ground, and are light green mottled with dark green. They are tough and fibrous rather than succulent, which is the term that has been used to describe the leaves of closely allied species. The plants may occur singly but are more often massed in communities 20 to 50 yards across. Those sent to Pretoria for growing have never thrived and never flowered, nor were they seen flowering in the field, but it is known that the inflorescence is spike-like along a 12-inch flowering stalk, and that it consists of crowded usually off-white flowers half an inch across. Flowering seems to occur rather rarely and sporadically in the genus as a whole.

This species was widespread and fairly frequent north and south of Ghanzi. It was not found in the open grassland but always among trees and scrub, though not necessarily shaded by them.

The rhizome is a useful source of water. It has a crisp, white fibrous 312 flesh which is juicy and, although slightly bitter, not unpleasant. There 824 are several species of Sansevieria growing in cultivation in Pretoria all alike in habit, and all have been tested. There is no perceptible difference in the taste or juiciness of any of them.

The leaf fibres of the plant described are used by the Bushmen in 283 making a string of surprisingly good quality. 824

Wallera nutans Kirk (5311) Photograph 8.

Eastern !khũ Bushman tʃũ

The plants are about six inches high, with a slender erect central stem 137x bearing paired light green grass-like leaves, strongly keeled and somewhat fleshy and faintly crystalline on the surface. Both the stem and the keel of the leaves are sparsely covered with short soft spines. Three or four strongly scented nodding flowers are borne, superficially very like potato flowers. There is a firm round storage organ a few inches below the surface of the ground, slightly larger than a golf ball and the colour of a new potato.

μ137 Two storage organs of this plant were found by the Bushmen near Nama Pan in August 1955. They lay dormant for a further 16 months after being planted in Pretoria, then both plants grew out and flowered within a few weeks of each other. The parts above ground disappear during the winter for they are very susceptible to frost.

[262] [252] The storage organ is edible. It has a pasty texture and little taste if eaten raw, but is improved by baking.

Eulophia sp. nearest *E. pillansii* Bol. (5279, 5304) Photograph 9.

Eastern !khû Bushman ≠gɔ?ɔ

An erect stemless plant with four or five spreading glabrous grass-like leaves half an inch wide and 11 inches long, prominently three-keeled on the back and grooved above, and fairly soft and lax. They rise in tufts, each one from a corm the size and shape of a slightly flattened golf ball with "eyes" on the upper surface and short stout roots below. The corms have a brown skin covering a white fairly firm flesh. They are often linked together five or six at a time, and are to be found an inch or two below the sand. The above-ground parts die back during the winter and usually disappear without trace before the next season's growth begins. The plant flowers after the new leaves appear and has the flowers arranged alternately in an open inflorescence at the end of a 12-inch flowering stalk. They are yellow and green, and about half an inch long.

A few corms were found by chance in two places near Nama Pan, in the shelter of small thickets. They flowered in Pretoria but could not be matched with any of the named specimens in the National Herbarium and the species may be undescribed.

[252] [262] The corms are edible raw or roasted. They were peppery when tasted in Pretoria, probably because they had been planted too near the surface and had become green through the action of the light. At Nama Pan they were mild and tasteless with a pasty texture.

Eulophia sp. (5213, 5306) Photograph 10.

Eastern !khû Bushman ≠gawu

The corms of this orchid are a little bigger and coarser than those of the other species of Eulophia (numbers 5279 and 5304) but are otherwise similar. The leaves are erect, somewhat curved, eight inches long and slightly more than half an inch wide, pale yellowish-green, rigid and firmly fleshy, with a channel running down the upper surface and a corresponding keel on the lower surface. This plant grew well but did not flower in cultivation in Pretoria and the species has not been determined.

It was found in the same locality as the other Eulophia and under similar conditions.

[262] The corms of the two species are used in the same way by the Bushmen, and cannot be distinguished by taste or texture.

Ximenia americana L. var. *microphylla* Welw. ex Oliv. (5061) Photograph 11.

!hɔ̃: Bushman.........	n≠?uri
ǁganakwe Bushman...	n≠?uri
ǀgikwe Bushman......	≠ɔti
Naron Bushman......	n≠?uri

Very like the following species (*Ximenia caffra*), but except for the flowers glabrous throughout and with smaller glaucous leaves which tend to fold along the midrib and droop, giving it a rather unattractive look. Its fruits are lighter in colour, and smaller. The two species were often found growing together, but no evidence of hybridisation was seen.

It is recorded from South West Africa, the Bechuanaland Protectorate, the Transvaal, Portuguese East Africa and Natal. On the expedition it was not seen north of the Ghanzi area but near Ghanzi and to the south it was widely scattered, and sometimes fairly common in small patches. 137 ✗

The fruits are edible, and the remarks on the fruits of *Ximenia caffra* apply to the fruits of this species also. Ripe fruits were found at Ghanzi in July, although fruiting is usually over by then. [824]

Ximenia caffra Sond. (4949) Photograph 12.

!hɔ̃: Bushman......	n≠ ?uri
‖ganakwe Bushman...	n≠ ?uri
gikwe Bushman......	≠ɔ?i
Naron Bushman......	n≠ ?uri

A stout or straggly evergreen bush or small tree, usually about six feet high, with soft brittle branches and knobby rough twigs which are densely leafy and sometimes end in a sharp spine. There are often spines in the axils of the leaves as well. The leaves are dark green and tend to curve backwards slightly, and they and the young twigs are softly hairy. The flowers appear in early summer. They are massed along the twigs and have four recurved green petals with conspicuous white hairs on the inside. The fruit is the size of a plum, and an attractive light red.

It probably occurs in Angola, for it has been recorded from northern South West Africa near the Angola border. It is also known from Northern and Southern Rhodesia, the Bechuanaland Protectorate, the Transvaal, Portuguese East Africa and Natal. Like the other species of *Ximenia*, it was not seen along the route of the expedition north of the Ghanzi area.

The fruit is edible. It has a bitter skin and a large stone, and a reddish pulp between them, pleasantly flavoured but astringent and sour, and particularly sour next to the stone. It is at its best when over-ripe, for it does not become soft and unpleasant as many fruits do, but dries out slightly, becoming wrinkled in the process and more mellow, with the flavour of a prune. The stone is rich in oil, but this is said to be very pungent (Marloth, 1913-1932: I: 165) and to contain a rubbery substance (Schweikerdt, 1937: 179-182). The Bushmen use it to anoint themselves but do not consider it edible. It has been tested in England for possible commercial uses, but it was decided that the oil was not worth extracting. [302 824]

Hydnora sp. (5162) Photograph 13.

Eastern !khũ Bushman	‖hɔk ?am

This curious plant is parasitic on the roots of *Combretum hereroense*. It is almost completely subterranean and is without chlorophyll. There is very little of the plant until it produces its flowers and fruits, which are much larger than the vegetative parts. The fruits are buried a few inches deep and are the size and shape of a pomegranate, but have a dark roughened woody shell split by many fine irregular cracks. The inner skin which shows through is red until the fruit ripens, when it becomes white. If the fruit is cut open a large, slightly sticky mass of pin-head brownish seeds is exposed, embedded in a pasty matrix which fills the inside of the fruit but is separate from the shell. Flowering was over by the time the first specimens were seen, but it is known that the flowers of this genus have a smell of carrion and that they protrude above the ground, where they can be reached by the insects necessary to bring about their fertilisation. They have no petals or sepals in the usual sense, their

X:37 place being taken by a few thick fleshy erect lobes, and from the woody remnants of old flowers in this particular species it could be seen that they had four lobes. The two species recorded from South West Africa are *Hydnora africana* and *Hydnora solmsiana*, parasitic respectively on species of Euphorbia and species of Acacia. Number 5162 is either a new species, or one of the known ones parasitic on a hitherto unrecorded host. The material collected was inadequate for specific determination, and the seeds which were planted did not germinate.

This Hydnora was seen only in the immediate neighbourhood of Nama Pan, where it appeared to be fairly frequent.

The host plant is a straggly shrub up to six feet high, with grayish woolly leaves an inch long. It has the characteristic four-winged fruits of the genus, and many remain on the twigs through the winter. It was not seen in the country to the south of Ghanzi, but was common from Ghanzi northwards, and is widely distributed in Portuguese East Africa, the Transvaal and Rhodesia. A glossy-leafed form of it is also known, but was not seen along the route of the expedition.

[262] The whole mass inside the Hydnora fruit is edible. It is astringent and slightly sweet, and is eaten raw. The fruits would be difficult to find if it were not that they are eaten by various animals. [222 824] A litter of half-eaten fruits and fragments of rind and shallow burrowings often show where the fruits have been excavated, and where more may be expected. They ripen about the end of August.

Talinum arnotii Hook. f. (5256) Photograph 14.

Eastern !khû Bushman ‚ǁgwi₋ja (stems and leaves)
≠k"arɔ (tuber)

During the winter there is seldom any sign of this plant above ground for the branches wither and die back with the first frosts. There is a perennial tuber a few inches underground, irregularly shaped and up to a pound in weight, crisp in texture and exuding a little cloudy astringent juice when injured. It has a brown skin and a reddish-brown zoned flesh. Although it is often eaten into hollows, presumably by rodents and insects, it is not eaten by the Bushmen. The stems appear in September and form a loose mat three feet in diameter on the surface of the ground. They are reddish-brown, prostrate and sappy, and the leaves are dull green and fleshy, channelled down the centre on the upper surface and with slightly crystalline appearance. The bright yellow flowers, which are produced in midsummer, are an inch across and quite showy, but open only in the heat of the day. They have two sepals and five petals. The flower-stalk starts bending when the flowers are mature, and by the time the fruits are fully formed it is curved sharply back. The fruits are the size of a small pea, shiny green and pointed at the tip, and covered by the withered remains of the perianth. They become yellow when ripe, with a papery shell and seeds the size of a pinhead.

The tubers of this plant were often unearthed in the more open parts round Nama Pan. I am doubtful whether it should be kept separate from *Talinum caffrum*, which is distributed from the Cape Province northwards to the Sudan and is very variable in its leaves and habit.

[262] [252] The leaves and smaller branches of this species are used by the Bushmen as a green vegetable. They are usually prepared by being pounded in a mortar to a paste which is dark green and slightly slimy and has a faintly acid taste with a flavour of lettuce.

Pollichia campestris Ait. (4963, 5040) Photograph 15. 137X

A small grey-green bush with much-branched slender soft stems, fairly compact when growing in the open but usually found as a semi-scrambler up to four feet high. The leaves arise in tufts of about three, the tufts being opposite each other and at intervals of anything up to an inch along the stem. They are lanceolate and usually under half an inch long. The plant bears what at first sight appear to be fleshy translucent fruits like small white or yellowish mulberries, but which are actually parts of the flowers.

This is a widespread plant throughout Africa, and was seen at intervals all along the route taken by the expedition.

The fleshy parts of the flowers are edible and sweet, with a queer earthy flavour, and are loosely attached so that they may be easily collected by pulling the stems through the hands. The plant, however, did not appear common enough to be of importance as a food. [262]

Boscia albitrunca (Burch.) Gilg and Benedict (4998, 5208) Photograph 16.

!hɔ: Bushman........	≠hun
‖ganakwe Bushman...	n|ßu-ni
|gikwe Bushman......	n|ßu-ni
Naron Bushman......	n|ßu-ni
Eastern !khû Bushman	zǎ

This is a rather variable tree, sometimes with erect branches and sometimes with a spreading crown, usually bearing many thin twigs with much dead wood among them. The bark is sometimes loose, dark and coarsely fissured and sometimes white and flaky. The species was also often seen in the form of a many-stemmed shrub about four feet high. It is evergreen, and did not seem to be at all affected by the heavy frosts that were experienced in the central Kalahari. The leaves arise singly or in bunches of four or five from small knobs on the twigs, and are leathery and about one inch long and a third as wide. Although the flowers are small and inconspicuous as individuals, they are borne in masses towards the tips of the twigs and make quite a show. In the Cape and the Transvaal at least the tree appears to be sporadic in its flowering. The fruits are borne on half-inch jointed stalks, and are half an inch in diameter, pale-skinned and translucent, with several large stones surrounded by a thin, watery pulp.

The tree was scattered evenly throughout the country from Molepolole to Ghanzi and Gautscha Pan, and has been recorded from the Cape Province northwards to the tropics. It occurred singly, occasionally in open communities, but it was never seen to form thickets.

The fruits are eaten by the Bushmen, but they do not make pleasant eating, for the pulp has a rather slimy texture and a sickly-sweet taste. [262]

Sim (1907: 123) refers to a meal which is prepared from the roots by drying and beating them. [252] The resulting meal is then sifted to remove the fibres and may be made into a porridge. There are reports of gastro-intestinal disturbances after the eating of Boscia roots, but the reports have not been confirmed, and Steyn (1934: 561) fed large quantities to a rabbit without ill effects. It is suspected that people are susceptible only when they are not accustomed to this food. The Bushmen were not asked about their use of the roots, and did not volunteer any information. [114 124]

The older trees are often hollow, and form natural reservoirs for rain water which is tapped by the Bushmen. (See Adansonia.) 312 824

Acacia species.

X137 [262] The species of Acacia mentioned in this paper often exude edible gum from injuries on the stem. It is a safe assumption that the gum from species that are not mentioned would also be edible, for none are known to be poisonous. All African species have alternate bipinnate leaves of the pattern shown in the photograph of *Acacia heteracantha*, and all are thorny.

Acacia detinens Burch. (4947, 5070, 5206).

!hɔ̃: Bushman.........	ǁwa
ǁganakwe Bushman...	ǁwa
ǀgikwe Bushman......	ǁk'uwa
Naron Bushman......	ǁwa
Eastern !khũ Bushman	!gõõ

A rigid shrub usually seven or eight feet high, with a smooth dark bark and paired hooked thorns a quarter of an inch long. It makes a bright show towards the end of August, for it is deciduous and the flowers appear in profusion before the new spring leaves. The flowers are scented and creamy, and massed in round heads up to half an inch across. The pods are flat and papery, two inches long and half an inch wide.

This was the most widespread of all the Acacias seen on the expedition, and was scattered all along the route. It is found in the northern Cape Province, the northern Transvaal, the Bechuanaland Protectorate, South West Africa, Angola, and Northern and Southern Rhodesia.

[262] It produces an edible gum.

Acacia dulcis Marl. and Engl. (5042).

A semi-deciduous tree usually about 25 feet high, with a number of erect three-inch stems arising from a common rootstock, and with a pale papery bark which has a tendency to peal. The thorns are paired and strongly hooked, a quarter of an inch long, stout, sharp and numerous. The flowers are borne in pale yellow spikes, and the pods which follow are flat and papery.

Only a few specimens were seen along the route of the expedition, all of them within a radius of 40 miles or so of Ghanzi. The tree occurs in the north-eastern Transvaal, the northern Cape Province, the Bechuanaland Protectorate, South West Africa, Angola and Nyasaland.

[262] Its gum is said to be of a particularly good quality.

Acacia fleckii Schinz (4943, 5067, 5205).

Eastern !khũ Bushman	n≠ŋ

A semi-deciduous shrub from six to eight feet high, very similar to *Acacia dulcis*, with the same pale flaky bark and hooked thorns and the same type of flower and pod, but with a different habit and usually finer leaflets.

Except between the Mabeleapudi hills and Tsau, where it was not noted, it was plentiful all along the route of the expedition. Its range is from the northern Transvaal through the Bechuanaland Protectorate and South West Africa to Angola.

[262] It produces an edible gum.

137X

Acacia giraffae Burch. (4945, 5069).

Eastern !khũ Bushman |ana

A tree, usually erect, with an umbrella-shaped crown and grayish foliage, darker green in the spring. Recognition is made easy by the gray woody pods, which are velvety on the surface and the size and shape of a flattened kidney, and which are to be found on and around the tree at all seasons. The flowers, which begin to appear in September, are scented and borne in small bright yellow heads, and the thorns are in pairs and stout. The bark is gray and fissured, and the crown rather dense, with much dead twiggy wood in it.

This tree was found all along the route between Molepolole and Gautscha Pan. As a rule it was scattered, but in one area, between Lake Ngami in the south and Tsau in the north, along the border of the Okavango swamps, it was the dominant tree. Some magnificent old specimens up to 30 feet in height were seen here. On the heavy sand between Molepolole and Ghanzi, however, it often occurred in the form of a shrub about six feet high. It is known from the northern Cape Province, the Orange Free State, the Transvaal, the Bechuanaland Protectorate, South West Africa and Angola.

Its gum is edible, slightly astringent but quite good to eat when fresh and clear. It becomes discoloured at times and is then less palatable. [262]

Acacia heteracantha Burch. (5341) Photograph 17.

Eastern !khũ Bushman |gali

This tree usually has an umbrella-shaped or flat crown and a delicate lacy appearance because of its slender twigs and fine leaflets. The flowers are borne in round white heads and produce small clusters of tightly curled pods. Like *Acacia uncinata* it has straight as well as hooked thorns.

It has been recorded from South West Africa, the Bechuanaland Protectorate and the northern parts of all four provinces of the Union, and extends as far north as Tanganyika, yet in spite of this wide distribution it was not seen between Molepolole and the Ghanzi area. There is at present no explanation for this strange gap in the centre of its distribution.

It produces an edible gum. [262]

Acacia uncinata Engl. (4950).

!hɔ̃: Bushman........	!ɔla
ǁganakwe Bushman...	ʼ!ũ
|gikwe Bushman.......	ʼ!ũ
Naron Bushman......	ʼǁgũ
Eastern !khũ Bushman	ʼ|gũ

A spreading 20 foot high tree, with a fissured bark and paired thorns, some of them straight and slender but most short and hooked. In this it resembles *Acacia heteracantha*, but its pods are straight and not curly as those of *Acacia heteracantha* are, and it is a stouter tree. The flowers are borne in round yellow heads half an inch in diameter.

There was no commoner Acacia than this from Molepolole to the Ghanzi area, but north of Ghanzi it became scarcer, and patchy in its distribution. It extends from the northern Cape Province through South West Africa and the Bechuanaland Protcetorate to Angola.

[262] 411 824 It furnishes the Bushmen not only with an edible gum, but also with the material for making quivers. These are made from the lateral roots, which are a foot or so below the surface. A suitably straight length is exposed and cut through, and after the cortex has been loosened by gently pounding it, it may be slipped off the woody central portion. The tube so obtained is then covered at one end with skin. The roots of this tree, like those of *Acacia giraffae*, have a most unpleasant smell when cut, something which is not apparent in the above-ground parts.

5

X137 *Burkea africana* Hook. (5332) Photograph 18.

Eastern !khũ Bushman -!k'u

An evergreen tree, with attractive drooping grayish compound leaves which are silvery when young. The tips of the youngest twigs are covered with a dense reddish pubescence, but this soon wears off and the older branches and the stem have a dark brown rough bark. The flowers are small but massed in showy hanging spikes six inches long and as thick as a pencil. They are cream-coloured and scented, and produce flat one-seeded or two-seeded pods two inches long. In the Transvaal the tree has a spreading crown. Beyond Tsau the habit was very different—the branches were ascending and shorter and gave the tree a slender appearance almost like a Lombardy poplar.

It is a widespread species in tropical Africa, extending from the Magaliesberg northwards to Abyssinia and Nigeria (Codd, 1951:61). Along the route of the expedition it was scattered from the south up to a point 171 miles from Molepolole, after which it was not seen again until 65 miles north-west of Tsau. It was found only on heavy sand, and beyond Tsau where sand and hard soil sometimes alternated at intervals of a mile or so the corresponding zones of Burkea were sharply defined. The central gap in its distribution is probably a climatic one, for there was deep sand in this area and conditions were apparently ideal for Burkea.

136 262 Burkea occasionally produces a little edible gum from injuries, but it is more important indirectly because of being the host of at least two edible caterpillars, one being the larva of the moth *Nudaurelia bellina* Westwood. This caterpillar is in length and thickness slightly bigger than one's little finger. It is marked with black dots on a yellowish-green ground, with a black transverse band just below each segment and a row of stiff black bristles on each segment. It is recorded from South West Africa and is no doubt known to the Bushmen and eaten by them, but as the expedition passed through those parts too early in the season no specimens of the caterpillar were seen. The Bushmen did bring in the pupae of what they said was an edible caterpillar, and Mr. L. Vari of the Transvaal Museum was unable to distinguish them from the pupae of *Nudaurelia bellina*. One cannot, however, assume from this that they are in fact the same, for the pupae of different species in this group may be indistinguishable.

136 Another caterpillar found on Burkea and recorded also from South West Africa is the larva of the moth *Cirina forda* Westwood. It is black below and silvery or golden yellow above, with a line of black markings down the centre of the back. It is sparsely covered with long white hairs. Many other species of caterpillars have similar hairs which are extremely irritant, but these are quite harmless.

The following observations were made in the Transvaal near Pretoria, 252 where infestation by *Cirina forda* is frequently so heavy that the affected trees may be readily recognised from a distance from the way in which the leaves are stripped. The caterpillar is prepared for food by being grasped by the head and squeezed through the thumb and forefinger of the free hand with a milking action. This clears out the bowel contents, and no further preparation is necessary before the boiling which follows. The head is rather hard and may be removed, but this is not necessary. After light boiling or roasting the caterpillars are dried in the sun and [251] may be stored without deteriorating for several months. They are slightly oily but crisp in texture, with the smell and flavour of kippers.

Bauhinia esculenta Burch. (5160) Photographs 19 and 20. 137X

Eastern !khû Bushman	tsi: (the seed)
	n‖ŋ (the storage organ)

This plant is a runner in open grassveld, with numerous slender vines up to 18 feet long, the youngest parts of them covered with a fine brown tomentum. They bear inch-long Y-shaped tendrils, but the plant is not a climber. The vines die back during the winter but do not disintegrate as readily as those of the Cucurbitaceae, and are conspicuous until the new runners are produced from the perennial underground stem. The leaves, which are soft and reddish-brown when young but turn leathery and glaucous as they grow older, are deeply bilobed, with a small spur between the lobes. The plant bears showy yellow flowers in December, and the pods ripen from April onwards. At first they are soft and reddish brown, then light green and, when ripe, brown and woody. They contain up to six flattened seeds about the size of one's thumb nail, consisting of a hard shell and a soft nutty edible inner part. The plant is easily seen because of the craters it forms where the soil is stony—craters a yard or more across, edged with a ring of stones which appear to have been forced to the surface by the stem beneath. The details of this crater formation, however, are not known.

This Bauhinia is curiously patchy in its distribution. Although it is plentiful in some places near Vryburg, it was not seen along the route of the expedition until a point 400 miles north of Vryburg, that is, 127 miles before Ghanzi was reached, and I have no record of it after leaving the Ghanzi area until the expedition crossed the border into South West Africa near Gam, after which it was again plentiful. It occurs in communities sometimes miles across, with the plants in these communities scattered 20 to 30 yards apart. On the expedition it was seen growing only on deep sand or where there were outcrops of limestone, and near Pretoria it has so far been seen only on the dolomite, but it has been grown successfully in Pretoria on neutral shaly soils. It has been recorded from the northern Cape Province, the western Transvaal, the Bechuanaland Protectorate and South West Africa.

Although the seeds are not pleasant to eat when raw, they are excellent 262
after roasting, and analysis figures show that they are rich in protein and 252
oil. The roasting should be carried out slowly, otherwise they may 146
shatter with a rather disconcerting report, and to avoid this they are often roasted in sand, which probably gives a slower and more even heat. They may also be boiled to make a porridge or a drink. They will last through the winter in the field without spoiling but become scarce towards the spring, probably through being covered with wind-blown sand and being eaten by animals.

262 252 (222) The sappy young tuber makes a good vegetable after baking or boiling. Those dug up by the Bushmen were about two pounds in weight and would not have been more than a few seasons old, for it is known from specimens grown from seed in Pretoria that it takes about ten years for them to reach 30 pounds. Burchell (1824: 589) says that they are astringent, but on tasting the 30-pound one mentioned I did not find it so. It was, however, rather tough and leathery.

With breeding, this might become a useful plant of cultivation.

X137 **_Bauhinia macrantha_ Oliv. (4887) Photograph 21.**

!h5: Bushman.......	¦intɛ
ǁganakwe Bushman...	n|an|hɛ
¦gikwe Bushman......	n≠an≠ɛ
Naron Bushman......	n≠i≠ei
Eastern !khû Bushman	≠ŋ≠wa

This species is usually a rigid three-foot shrub, but grows up to six feet where protected from fire and is sometimes found as a weak scrambler with stems up to 12 feet in length. Dinter (1912; 28) records one in the form of a tree five metres high, but this is quite exceptional. It has thin rather wiry twigs, some slightly curled at the tips, and alternate bilobed leaves which are shed during the winter. The younger parts are minutely hairy, but soon become glabrous. The flowers are borne at the tips of the twigs and are pure white and showy, with a pleasant scent and crisped petals. The pods are four inches long and one inch broad and contain five or six irregularly-shaped flattened beans.

Bauhinia macrantha has been recorded from near Molepolole, but is probably localised or uncommon there, for on the expedition it was first seen 60 miles northwest of Molepolole. From there on it was common, although there were occasional gaps in its distribution. It forms communities in open sandy grassy country, usually with the tips of the bushes just showing above the grasses, and has been recorded from the Transvaal, the Bechuanaland Protectorate, South West Africa, Rhodesia and Angola. It has grown well as a cultivated ornamental shrub as far south as Grahamstown.

252 262 The ripe beans are extracted from the pods, roasted peeled and pounded into a pleasant-tasting coarse rather gritty meal, edible without further preparation. The beans may also be used when they are green, but then it is more convenient to roast the whole pod so that it can more easily be opened. They are not eaten raw, for unless cooked they have a burning taste. The pods are easily opened when mature by bending them across the middle, when the two halves spring apart. The halves form spirals as they dry.

The importance of this species as a food plant was shown by the heaps of empty pods which were found at many Bushman shelters and Bakalahari villages. There is, however, a great deal of labour involved in preparing the meal, because although the beans have a thin shell and are thus easy to crack, it still takes about 1,500 of them to produce a pound of air-dry meal.

A note on one of Schoenfelder's specimens in the National Herbarium states that the root is also edible when roasted.

Like *Bauhinia esculenta*, this might be a useful cultivated plant if improved by breeding.

137X

Vigna dinteri Harms (5227, 5310) Photograph 22.

!hɔ̃: Bushman........	|ir̃i
Naron Bushman......	|ir̃i
Eastern !khû Bushman	ʃa:

A leafy twiner which climbs through trees and shrubs to a height of six feet or so. It produces numerous slender stems like a runner bean, and the leaves too are similar, being alternate and made up of three pointed and often lobed leaflets two inches long and half as broad. The terminal leaflet has a stalk over a quarter of an inch long, but the side leaflets are very shortly stalked. There are two narrowly triangular stipules where the leaf-stalk joins the stem, an eighth of an inch long and fixed at the base. The whole plant is finely hairy, but less so on the upper surface of the leaves than on the lower. The flowers are also like those of the runner bean, creamy to brownish-yellow, and are borne several at a time on a stalk up to five inches long. The pods are three inches long, circular in section and less than a quarter of an inch in diameter, and the seeds are bean-shaped but small, the size of a match-head. On a branching system of roots nine inches below the surface of the soil are borne swellings the size of potatoes, but more regular in outline and without the lobing which is so common with potatoes. In shape they vary from spherical through ovoid to long and only slightly thickened, and arise apparently in no particular order, for very small ones and large ones may be found next to one another on the same root, the spacing between them ranging from a fraction of an inch to a foot. The axis of the root (which is usually a little less than a quarter of an inch thick) passes through the centre of the swellings. As the plants were seen during the winter, there was very little remaining of the leaves and stems, and I have no information as to their frequency. Only two specimens were found, both in the neighbourhood of Nama Pan, and both in fairly thick mixed scrub in sand. Because of their habit of growth, it is unlikely that they would be found in open grasslands. The root swellings were planted in Pretoria and produced vigorous plants which flowered and set seed normally. The swellings themselves, however, were found to have been heavily infested with eelworm in their new habitat, and when they were replanted no further plants were produced.

Vigna dinteri has seldom been collected, and, as far as I know, only in South West Africa, though it is very likely that it extends into Angola and the Bechuanaland Protectorate as well. The fact that it is known to the !hɔ̃: Bushmen indicates that it may extend into the central Kalahari.

The swellings on the roots are edible raw or cooked, and are a pleasant and satisfying food. When raw they have a flavour which has been likened to that of grean beans. This is fainter after cooking. [262] [252]

It would be worth while investigating this plant with a view to bringing it into cultivation.

Vigna triloba Walp. (5257).

Eastern !khû Bushman	ga·ni

Although occasionally reported as a trailer in grasslands, the more usual form of this plant is a twiner very similar in habit to *Vigna dinteri*. It has the same type of trifoliolate leaf as well, but the leaflets may vary widely in different plants, being simple or lobed, hairy or almost glabrous, sometimes long and narrow and sometimes almost as broad as they are long. Some of the forms would be indistinguishable vegetatively from *Vigna dinteri* if it were not for a difference in the stipules. In *Vigna*

X137 *triloba* they are what is known as dorsifixed, that is they are fixed a little way up from the base so that the stipule is free at both ends. The flowers are the same size in the two species and have the same long stalk, but those of *Vigna triloba* are predominantly purple. They tend to open in the early morning and to close during the heat of the day.

Vigna triloba is reported from a variety of soils and is widespread through southern Africa, but it was not seen on the expedition until the Nama Pan area was reached.

262 [252] It has a finger-thick tap-root which is edible after boiling or roasting, although fibrous and slightly bitter. In mature plants it may extend downwards further than can conveniently be dug, but it is easily broken off. There appear to have been no previous records of its use as a food plant.

X137 *Commiphora pyracanthoides* **Engl. (5137) Photograph 23.**

Eastern !khû Bushman a‖ɔ

A deciduous, rigid, twiggy two-foot shrub with spine-tipped twigs, branches that curve downwards, and a bark that is pale green and flaky on the older parts and grayish on the young twigs. The flowers are less than a quarter of an inch long and inconspicuous, and are borne in bunches on small knobs scattered along the twigs. Male and female flowers are on separate plants. The knobs also bear the leaves, which appear after the flowers and are glaucous, simple and finely serrate, and about three quarters of an inch long and half an inch wide. The fruits are "ovoid, about the size of a green pea, though reddish brown when ripe. When the fruits are ripe, the fleshy covering may be easily split apart in two halves exposing the black seed with a red aril covering it partly at the base and extending in four slender 'fingers', producing an intriguing pattern". (Codd, 1951:87.)

The species extends from South West Africa to the northern Transvaal, but was uncommon in the area round Nama Pan. One specimen collected there was grown in Pretoria. Leaves and flowers were obtained in the summer following, and from this material the determination was made possible.

[262] 312 824 The plant exudes an edible gum from injuries and is a useful source of water in an emergency, the water being in a sappy underground organ which is like that of one of the following species of Commiphora, No. 4994. It is known as a water plant among the Bantu of the Transvaal as well.

X137 *Commiphora* spp. (4994 edible, 5030 inedible).

4994		5030	
!hɔ: Bushman..	dʒã	ǀgikwe Bushman	!ana
ǀgikwe Bushman	dʒã		
Naron Bushman	ǀuri		

Two species of Commiphora were collected in the Kalahari south of Ghanzi. They were completely deciduous rigid two-foot shrubs with many sharply-tipped twigs and a flaky bark. At first sight they were identical, and even close examination revealed no bigger difference than that one of them was a little more of a thicket than the other and slightly grayer. The Bushmen, however, stated emphatically that the grayish one was poisonous and the other not. They said also that the grayish one WAS THE HOST OF THE INSECT WHICH THEY USE FOR MAKING THEIR ARROW POISON, AND THAT IT HAD HARDER ROOTS THAN THE OTHER.

8.24
[278]
[825]

was the host of the insect which they use for making their arrow poison. 824
and that it had harder roots than the other. The fruits, flowers and leaves might have shown the difference clearly, but no trace of them could be found, and though plants were sent to the Transvaal for growing they failed to become established.

In spite of its unpromising appearance, the non-poisonous one is a 312
useful source of water. This is in a sappy unbranched vertical underground 824
part about an inch and a half thick. The Bushmen excavate down its [222]
length as deeply as they can reach, then break it off and withdraw it.
They remove the thin outer skin and chew the remaining part, which is [271]
crisp and has a little tasteless sap. As a source of water it does not compare with the various species of Cucurbitaceae—weight for weight it contains far less, and the labour of digging it up is considerable. However, it must be a reliable standby when the Cucurbitaceae are not in fruit, and in the central Kalahari it is plentiful. In the southern part it is apparently absent, for it was not seen until 256 miles north-west of Molepolole.

Dichapetalum cymosum (Hook.) Engl. 5109, 5266, 5338 Photograph 24. 137X
Eastern !khû Bushman ma-˥

This plant produces a number of slender erect woody stems up to 12 inches high, sparingly branched and often buried in the sand at the base. The leaves are four inches long, numerous, sessile, alternate, broader in the upper half where they are about one and a half inches across, and tapering at the base, with a stiff papery texture and with veins prominent above and below. They have a slight bloom on the upper surface and the younger leaves at least have a pair of narrow hairy stipules at the base. The younger parts of the plant are hairy, but the hairs wear off with age, and during the winter the leaves turn brown and hard and finally drop. The flowers are scented and have white petals forked at the end, but as they are small and nearly covered by the sepals, they are not conspicuous. The fruits are like a loquat, and may be brown or yellow. The have one or two big seeds covered by a little flesh.

Dichapetalum is distributed widely but patchily from the northern Transvaal through to Angola and Rhodesia. On the expedition it was seen for the first time between Tsau and Kaikai, and beyond that it was fairly frequent but scattered. It was usually in open situations, and seldom where there was dense tree growth.

Though the leaves are extremely poisonous, the flesh of the fruits 262
is harmless and is eaten by the Bushmen. They emphasised that the flesh only could be used, and that the stone was poisonous. They did not mention the skin, but the following note on Schoenfelder's specimen 31, in the National Herbarium, indicates that it, too, is poisonous:—

> "Fruits like small yellow oranges are eaten peeled in great
> quantities by the Kung Bushmen. When still green can be eaten [252]
> after baking in hot ash. Used like fruit, fresh. The peel of the [278
> fruit is stamped and mixed with other food to poison stealing dogs 824]
> (Diriko)."

Marloth (1913-25: II: I: 120) and Engler (1912: 577) also refer to the edibility of the fruits.

There are four other plants of very similar appearance which could 137X
be confused with *Dichapetalum cymosum*, and although they were not collected on the expedition, their distribution does overlap. They are *Pachystigma pygmaeum, Pygmaeothamnus zeyheri, Parinari capense* and *Diospyros chamaethamnus*. The first two bear inedible fruits and may be

X137 [262] distinguished by their having opposite leaves. The latter two bear edible fruits and like *Dichapetalum* have alternate leaves. The differences are that *Parinari capense* has leaves dark green above and covered with a white felt below, and that *Diospyros chamaethamnus* has no stipules.

Another species, *Dichapetalum venenatum*, has been described, but is in my opinion not specifically distinct from *Dichapetalum cymosum*.

Ricinodendron rautanenii Schinz (5336) Photograph 25.

Eastern !khû Bushman ‚ǁk"a:

The trees seen on the expedition were about 25 feet high and were then (at the end of August) quite bare, resembling slender baobabs, with similar but thinner stems, and smooth bark and stubby branches. Specimens collected elsewhere showed that the leaves are digitately compound, with about five leaflets and two prominent green glands at the top of the leaf-stalk. They are dark green above and pale below and covered with a pale to brownish powdery wool which is found on the young twigs and fruits also. The trees are either male or female. The small creamy flowers are borne in bunches towards the tips of the twigs and the female flowers give rise to reddish fruits the size of a small plum, consisting of a thin pulp surrounding a very hard nut. This is light coloured like an almond, thick and strong and marked all over with numerous small pores.

The only trees seen were on heavy sand near the banks of the Eiseb omuramba, 29 miles from Gam on the way to Windhoek, where they were dominant in a belt several miles wide. They formed a woodland, with the trees spaced about 25 yards apart. Herbarium records show that this is the usual mode of occurrence. The species has been recorded from South West Africa, the Bechuanaland Protectorate, Rhodesia and Portuguese East Africa.

252 262 The pulp of the fruit is edible raw or stewed. It does not readily go bad, but in time it dries and shrivels and in this condition, turned hard and crumbly, is still a wholesome food, edible raw or cooked. The stone contains one or two firm white-fleshed kernels which are, like the pulp, edible raw or cooked. The tree is an important source of Bushman food because of the quality and quantity of its fruit and because the fruits remain good for a long time even without being stored. Those seen on the expedition were on the ground beneath the trees and were still perfectly good to eat. The tree is additionally useful in that it sometimes collects and holds rain water in hollows in its trunk (see Adansonia). [312 824]

X137 *Sclerocarya caffra* Sond. (5292) Photograph 26.

Eastern !khû Bushman ˍgai

A few mature specimens were seen, about 20 feet high, and a few young ones. The mature trees had a single clean bole with a flaking bark and a branching rounded crown, and were very different in appearance from the young ones which consisted of four or five thick and sappy unbranched stems about five feet high, with a smooth brown bark. This was in August, and all were quite leafless. The following description is taken from Codd (1951):— "The leaves are pinnate with three or four pairs of well-spaced leaflets and a terminal leaflet. The leaflets are oval, smooth, tapering to an abrupt point and are about one and a half inches long and one inch wide. Flowers are inconspicuous and are produced in small sprays just before the appearance of the young leaves, some trees being predominantly male and others mainly fruit-bearing. The edible fruits are somewhat oblong in shape about the size of a small plum, consisting of a firm skin, pale yellow when ripe, enclosing a large hard kernel, to which adheres a soft whitish, fibrous flesh, with a sweet-acid refreshing flavour." 137X

These trees are recorded from tropical Africa southwards as far as Pretoria and Natal, but they were not seen along the route of the expedition south of Nama Pan. They were growing in sandy soil in fairly thick mixed bush.

Sclerocarya is well known as a wild fruit-tree throughout this range, 262 and the fruits are eaten by many different animals as well as by man. They fall when still immature, but ripen quickly on the ground and become strongly aromatic. The Bushmen make use of the fruit after the pulp has been eaten or has rotted away, for the stone which remains contains a little oily flesh with a pleasant nutty flavour. However, as the stone is very hard and makes up 90 per cent of the whole, the labour involved in smashing it and extracting the flesh is considerable. The Imperial Institute, which investigated the stones to see whether the oil could be produced on a commercial scale, concluded that such a scheme would not be worth while.

Lannea edulis (Sond.) Engl. var. *glabrescens* Engl. (5185) Photograph 27. 137X

Eastern !khũ Bushman gaga-ʃe

A plant with a thick underground trunk, from the crown of which arise a number of thin stems a few inches high, bearing 12-inch compound leaves. The leaves seen in the field had all been killed by frost but had not fallen although it was at the end of winter. They had a stiff, papery texture and appeared completely glabrous to the naked eye, but a few stellate hairs could be seen along the veins when the leaf was put under the lens. The following notes on the fruits are taken from the pamphlet by Verdoorn (1938:22):— "The ovary has four erect styles the remains of which can be seen as four little points on the mature fruits. The fruit which is only about half an inch long, is scarlet until it ripens, at which stage it turns purplish black. There is only a small amount of flesh but it is juicy and pleasantly sour. The stone is just over a quarter of an inch long, oblong and laterally compressed with the surface somewhat pitted."

One specimen was found during the expedition, growing in open woodland on sandy soil near Nama Pan, but the Bushmen stated that it becomes more frequent towards the north. It is widespread through the northern Transvaal and occurs in Southern and Northern Rhodesia as well as the Bechuanaland Protectorate and South West Africa. The glabrous form is rarer than the form with hairy leaves.

It is quite well known throughout its range because of its edible [262] fruits, but it appears to be a rather sporadic bearer.

Rhus commiphoroides Engl. and Gilg (4889).

A semi-deciduous spreading shrub up to six feet in height with rigid branches and downy twigs, many of them spine-tipped. The leaves, which are also downy on both surfaces, are borne on a stalk a third of an inch long and consist of three obovate leaflets, toothed in the upper half and dull green. The minute flowers are greenish and inconspicuous and in lax sprays at the ends of the branches. The fruits are borne in clusters and are a quarter of an inch long and kidney-shaped. They are dry and have a papery brittle skin which is purple with glaucous bloom.

X137 The plant was uncommon along the route of the expedition although it has a wide distribution from the northern Cape and the Transvaal through the Bechuanaland Protectorate to South West Africa and Southern and Northern Rhodesia.

[262] The fruits are edible. They have a sour taste and a strong aroma and little more than that for they consist mainly of the skin and the stone.
[263] The leaves are sometimes used by the Bushmen for flavouring meat.

Ziziphus mucronata Willd. (4873, 5202) Photograph 28.

!hɔ̃: Bushman........	!e:i
ǁganakwe Bushman...	,ǁaja
|gikwe Bushman......	≠k'erɔ
Naron Bushman......	≠k'aru
Eastern !khũ Bushman	,n≠a:

A semi-deciduous shrub or tree up to 12 feet high, twiggy and profusely branched, with the older branches drooping at the ends to give it a rounded shape. As a rule it is very thorny, with the thorns in pairs, of which one is hooked and the other straight. Thornless specimens have been reported, but are rare, and none were seen along the route of the expedition. The plant has alternate dark green shiny toothed leaves, tapering to a point at the tip and with three or four prominent veins branching from near a rounded base. They are stalked, and glabrous or nearly so. The flowers are in small greenish clusters and are not conspicuous. The fruits are ripe in early winter, but the trees bear sporadically and the crop varies greatly in quantity in individual trees. The fruit is brown and a third of an inch in diameter, with a shiny brown papery skin surrounding a thin layer of rather dry, mealy substance and a large stone.

This tree is widespread from the Sudan to the Cape Province. It was uncommon on the deep Kalahari sand but fairly frequent in the hard soil round the edges of the pans, where it sometimes formed open communities.

[262] The mealy substance in the fruits is sweetish and is eaten by the Bushmen, but it is not pleasant even by their standards.

Grewia avellana Hiern (4959, 5269) Photograph 29.

!hɔ̃: Bushman........	n!ɔ≠udi
ǁganakwe Bushman...	n!ɔ≠udi
|gikwe Bushman......	ǁgam-tsa
Naron Bushman......	dʒudʒubu
Eastern !khũ Bushman	dzwa:ma and zɔ:ma

Because of its habit, this one of the few Grewias distinct from the many which look alike. It occurs as a number of slender erect 18-inch stems in patches a yard across, bare in winter except where sheltered from the frost. It has also been recorded as a shrub four feet high. In summer the stems are leafy enough to trap the wind-blown sand, so that they are usually found growing up through a slight hummock. The leaves, borne on very short stalks and measuring one and a half inches by an inch, are alternate, serrate, roughly hairy, prominently veined and dull green. The flowers have narrow white petals and are half an inch across. The fruits are a shiny dark brown, half an inch in diameter and characteristically lobed, being known in Sechuana by a name which means *the buttocks of the queen*. Only a few specimens were found in fruit, which suggests that the season was over by the time the expedition started from Molepolole (mid June).

The plant was widely distributed along our route, sometimes in the open grassland and sometimes in the belts of woodland, but was not common. It has been recorded from Angola, South West Africa, the Bechuanaland Protectorate and the Transvaal. 137X

The fruits are edible but not very palatable, for they consist of large stones and only a little pulp, sweet and slightly mucilaginous. Nevertheless, according to a note on one of Schoenfelder's specimens (Schoenfelder No. 8, in the National Herbarium) they are a staple food not only of the Bushmen but also of several Bantu tribes, and can be kept when thoroughly ripe. 262 [251]

Grewia flava DC. (4941, 5024) Photograph 30. 137X

!hɔ̃: Bushman........	,n‖a:
‖ganakwe Bushman...	,k'um
ǀgikwe Bushman......	,k'wam
Naron Bushman......	,k'um
Eastern !khũ Bushman	,nǀŋ

A rigid shrub about five feet high with numerous erect straight stems, often branching below the soil and so appearing unconnected. They are softly hairy when young. Old stems have a smooth dark bark and are sometimes slightly angled. The serrate leaves, which are shed in winter, are dull gray-green above and covered with a fine silvery down below, and make an attractive background for the bright yellow flowers which come out in midsummer. The fruits are half an inch across, usually four-lobed, and brownish-yellow when ripe.

Grewia flava is known from the four provinces of the Union, and from South West Africa and the Bechuanaland Protectorate. It occurred nearly everywhere along the route of the expedition and was one of the commonest shrubs of the central Kalahari, but only one of all the thousands of plants seen was in fruit.

The fruits have a little edible sweet pulp surrounding the seeds. 262 They are an important Bushman food, not so much because of their quality as because of their abundance, and because they can be kept if they are [251] first dried. They are then soaked in water or cooked before being eaten. [252]

Grewia flavescens Juss. (5053).

A lax deciduous shrub or scrambler up to 12 feet in height, with slender stems which often become four-angled in older specimens, and with leaves, flowers and fruits similar to those of *Grewia retinervis*. There was little of it fruiting, but whether the season was over or whether it is naturally not a heavy yielder is uncertain. 137X

This species has a wide distribution through tropical Africa. It was not seen south of Ghanzi, but was scattered from Ghanzi northwards to Gautscha Pan.

Its fruits are eaten by the Bushmen. As most of the Grewias were leafless and as there were more species towards the north, it became increasingly difficult to estimate the frequency of each when once the Ghanzi area had been passed, and nothing can be said as to the relative importance of the northern species in the Bushman diet. 262

X137 *Grewia retinervis* Burret (4875, 5066) Photograph 31.

!h5: Bushman........	⊚b5:
‖ganakwe Bushman...	‖?ani
|gikwe Bushman......	‖gani
Naron Bushman......	‖gani
Eastern !khû Bushman	!gwa

A straggly many-stemmed five-foot shrub, sometimes a weak scrambler up to 10 feet high. The stems are half an inch thick at the base, rounded and slightly woolly when young, slightly flattened and glabrous when old, and tough and pliant. Its leavers are alternate, pale green, one and a half inches long and an inch wide, ovate with a pointed tip, toothed, and roughly hairy to the touch. They wither and fall soon after being frosted, but if out of reach of the frost remain on the bushes at least until the end of July. The plant bears spreading yellow flowers half an inch wide, and fruits the size of a pea, with a papery brown skin enclosing a few large pips and some fibrous mealy material. *Grewia retinervis* is closely allied to *Grewia flavescens*, so much so that I doubt whether the two should be considered anything more than varieties of one species. The differences are that *Grewia flavescens* is usually taller, and not so conspicuously veined on the upper surface of the leaves. Mr. B. de Winter, of the National Herbarium, Pretoria, has observed also that its older stems are square in section and those of *Grewia retinervis* are flattened.

Grewia retinervis was scattered over most of the area covered by the expedition, and common in the central Kalahari, specially in open grassy country. It has been recorded from the northern Cape and the Transvaal as well as South West Africa and the Bechuanaland Protectorate.

262 The fruits are edible. They ripen in winter, and have a slightly sweet
[251 taste and a pleasant flavour. They may be stored after being dried, and
252] are then soaked or boiled before being eaten. The crop, if one may judge
from the 1955 season, is abundant, and the amount fairly constant for
all the bushes. The fruits form an important part of the Bushmen diet,
[146 although little of them appears digestible. The roughage is voided almost
147] unchanged, in enormous faecal masses up to two and a half inches in
diameter.

824 The dry stems of this plant nearly always contain the tunnelings of
372 grubs, and the tunnellings are packed with their excreta in the form of
a brown, pith-like substance which forms a useful tinder. The Bushmen
split the stems down the centre, make a slight depression in the flat
surface and use this as a socket for the fire-drill.

X137 *Grewia* sp. aff. *Grewia bicolor* Juss. (5056).

Eastern !khû Bushman gamak'wɔ:

A slender shrub up to six feet high, with many sparingly branched stems. The leaves are one and a half inches by one inch, very finely toothed, dark green above and pale below, pointed at the tip and rounded at the base. Both surfaces are covered with a fine grayish felt which is thicker on the lower surface. Typical *Grewia bicolor* has wool on the lower surface only. The fruits are the size of a pea, and have a little flesh covering usually one big seed. No flowers were seen.

This is another of the plants with a distribution which begins in the Ghanzi area and extends northwards, and the remarks made as to the distribution and importance of *Grewia flavescens* apply here also.

[262] The fruits are edible.

Adansonia digitata L. Photograph 32. 137X

Eastern !khū Bushman ≠m

The Baobab, as it is commonly called, is shown in photograph 32. Its stem may have a circumference of up to 148 feet, and makes it quite unmistakable. In winter it is leafless but in summer it bears dense dark-green foliage. The flowers are pure white and up to six inches across, and the fruits, as described by Codd (1951: 120) are "oblong or egg-shaped, five to six inches or more in length and three to four inches in diameter, with a woody shell which is softly grey-velvety on the outside".

The southernmost specimens were seen in the neighbourhood of Ghanzi, and from there it occurred sporadically to Gautscha Pan, the furthest point north reached by the expedition. There were big gaps in its distribution and it was rare throughout, but in some parts of the Transvaal it occurs abundantly and may have an unbroken distribution over many square miles of country. It is widely distributed in the drier regions of north and south tropical Africa.

Inside the shell of the fruit is a white, pith-like substance which may 252
be eaten raw, or ground up and stirred into water to make a drink, or 262
boiled to make a porridge. It has an acid-sweet taste. The seeds which [272]
are embedded in the flesh are also edible and are eaten like nuts. In
other parts of Africa they are prepared in a somewhat involved way
which includes protracted boiling, fermenting and drying. There are
several records of the fact that the young leaves make quite a good substitute for spinach, but as the expedition was during the winter and as the
trees are deciduous, I cannot say whether the Bushmen know of this, nor
whether the trees we saw were of the glabrous variety which is the one
used for spinach. No seedlings were seen. It is known that the white
shoot from the germinating seed can be used as a substitute for asparagus,
and that the tender root of the very young Baobab is also edible (Dalziel,
1937: 113). The trees are often hollow, and like *Boscia albitrunca* and 271
Ricinodendron rautenii may act as reservoirs for rain water which can be 312
used in times of scarcity. The Bushmen reach it by fitting hollow grass 824
stalks end to end to form a tube, and sucking it out. A further product 262
of the Baobab is a large caterpillar which feeds upon the leaves and which
is an important article of food aming the Natives of the northern Transvaal. 136
It is recorded also from South West Africa, and is very likely known to 825
and used by the Bushmen.

Ochna pulchra Hook. (5273) Photograph 33. 137X

Eastern !khū Bushman !i and !e:i

A semi-deciduous tree with a clean but usually rather twisted bole which is white to light gray and has a peeling bark. The branches are bent and rigid and the wood brittle. They bear glossy light green alternate leaves which are almost sessile and usually entire, rarely with a very finely toothed margin. The tree has an attractive appearance even in winter, and the young leaves add to this in the spring for they range from pale green to reddish-brown. The flowers are borne in early summer, in showy scented bunches. They have yellow petals and a green calyx, which persists after the petals have fallen and turns bright red. The fruits are hard and green when immature but turn fleshy and black as they ripen. There are usually two or three, the size and shape of small beans, attached to a fleshy red swelling in the centre of the flower. The leaves have been suspected of causing poisoning in stock, but tests carried out on mammals have so far been inconclusive. (Uys and Thomas 1952, Steyn, 1949: 125.)

X137 *Ochna pulchra* is well known and widely distributed from the Transvaal to Northern Rhodesia and Angola. It was frequently seen in southern Bechuanaland and again in the north, but there was a gap between of about 200 miles where it was not recorded. Ghanzi was approximately in the centre of this gap. In the parts traversed by the expedition it was seen growing only on deep sand or in rocky soil.

252 262 The Bushmen stated that the ripe fruits when boiled in water yield a fat, which can be skimmed from the surface and used as food. This is confirmed by the notes on the specimen collected by E. B. W. Schoenfelder (number 28):—

> "Fruit when still green eaten after roasting in ash (Kung). When black and ripe cooked with water and the fat skimmed and preserved. The cooked fruit is eaten with pips (Kung and Diriko)."

X137 *Combretum apiculatum* Sond. Photograph 34.

Eastern !khũ Bushman ǁaja

A small tree or many-stemmed shrub, usually about 10 feet high in the drier areas. It has paired rather stiff pale green glabrous leaves with a varnished appearance, which turn yellow in the autumn and persist on the tree well into the winter before being shed. The flowers are small and greenish-yellow and would be insignificant except that they are numerous and massed at the ends of the twigs. The fruits have four papery wings and are about an inch in diameter.

Combretum apiculatum is widespread and often common, extending from Northern and Southern Rhodesia through the Bechuanaland Protectorate to South West Africa and through the northern Transvaal to Natal, but it was not seen along the route of the expedition until the Gautscha Pan area was reached, where it occurred sparingly.

[262] The Bushmen stated that it produces an edible gum. I have been able to confirm this in the Transvaal, but observed that the gum is produced only rarely.

Combretum coriaceum Schinz (5052, 5270, 5330).

Eastern !khũ Bushman ≠gwa

An evergreen tree with paired stiff gray-green leaves. It is usually rather erect and in these parts seldom more than about 10 feet high, though it grows up to 30 feet under moister conditions in the northern Transvaal. The flowers appear towards the beginning of September. They are yellowish in colour and small, but crowded into showy little masses towards the tips of the twigs. The four-winged fruits are reddish-brown, and dry and papery.

It has been recorded from tropical Africa southwards to the Transvaal and Natal, but under a variety of names. Along the route from Molepolole to the north it was first seen 67 miles before Ghanzi. From there to Gautscha Pan it was fairly common except in the neighbourhood of Lake Ngami and the Okavango swamps.

[262] Although the tree produces an edible gum, it does so too rarely to be of importance as a food supply.

137X

Combretum imberbe Wawra (5204) Photograph 35.

Eastern !khũ Bushman ≠ɔ

There were some magnificent specimens of this tree seen on the expedition, up to 40 feet in height, but the average was about 20 feet. It is rather sturdy as a rule, with a clean bole and light gray bark which is deeply fissured in all directions, and rigid branches and twigs. When young these are opposite or sub-opposite, straight, and often tipped with a hard spine, but as they grow older the spiny character is lost and the growth form becomes crooked so that the symmetry is masked. The tree has small opposite gray leaves an inch long and half as wide, and like the other species of Combretum it bears four-winged fruits and small inflorescences of yellowish flowers.

It was frequently seen in the Ghanzi area and to the north of Ghanzi, but not to the south, although it has been recorded from as far south as Vredefort in the Orange Free State. Its range is from Natal and the Transvaal through to tropical Africa.

It exudes an edible gum, but only rarely. [262]

Terminalia sericea Burch. Photograph 36.

Eastern !khũ Bushman ¯dzɔ and za¯ɔ

Sometimes a graceful, erect, 30-foot tree with horizontal branches and a dark gray fibrous bark, and sometimes a much-branched shrub two or three feet high. The twigs tend to curve upwards slightly and bear towards the tips bunches of soft alternate leaves three inches long and an inch wide, darker on the under surface and covered with a fine silvery down. The tree is seldom completely deciduous, and many of the fruits also remain on the twigs through the winter. They are reddish and consist of a flattened seed with a wide membranous margin which forms a wing and aids their distribution through the wind. The flowers are borne in creamy catkins and have a strong and rather offensive smell. Another characteristic feature is that the twigs often have walnut-sized galls round them.

This species was common all along the route of the expedition, and has a wide distribution from east and west tropical Africa to the northern parts of the Cape Province and the Transvaal. It is usually on deep sand, and usually in communtities.

It sometimes produces an edible gum from injuries in the stem. [262]

Royena sericea Bernh. (5018, 5249).

A many-stemmed deciduous shrub up to six feet high, with a dark bark and crooked branches. The dull green leaves are obovate, sometimes pointed, alternate, velvety when young, usually one inch by half an inch but sometimes much smaller, and they tend to be crowded towards the tips of the twigs. Its flowers are creamy, inconspicuous but scented, with the petals tightly furled in the bud. The fruits are half an inch long, ovoid and with a smooth skin which turns red when the fruits are ripe. They contain several large seeds and a little yellowish pulp.

This shrub was widely scattered north of the Ghanzi area and rarer still to the south, where only one small clump was found.

No information was obtained from the Bushmen about it, but the pulp of the fruits is known to be edible and would no doubt be used in an emergency. It is faintly sweet, and insipid. [262]

X137 *Strychnos cocculoides* Bak. (4916) Photograph 37.

ǁganakwe Bushman...	,ǀguwa

A 15-foot tree, erect and rather slender, sometimes unarmed and sometimes with very sharp paired curved thorns a little less than half an inch long. The leaves, which are also paired, are soft, minutely hairy and an inch and a half long and an inch wide with three prominent veins branching from near the base, one central and two near the margins. The old bark is dark gray, corky and deeply fissured, but the young twigs have a smooth bark densely covered with a fine down. The tree produces small greenish flowers massed into heads three quarters of an inch in diameter. The fruits are a little over a pound in weight and four inches in diameter, the size and shape of a gem squash, with the same type of hard rind, green when immature and turning pale brown when ripe. The seeds inside are embedded in a strongly aromatic pale pulp.

Strychnos cocculoides is recorded from the western Transvaal, the Bechuanaland Protectorate, Angola and central tropical Africa. On the expedition it was seen scattered through only one belt of heavy sand which began 136 miles north-west of Molepolole and ended 35 miles further on.

262 The fruits have an unusual and pleasant flavour, and according to a note on one of Schoenfelder's specimens in the National Herbarium the seeds may be eaten as well as the pulp. Galpin (1925: 22), who describes this tree under the name *Strychnos schumanniana*, states that the fruit may [251] be picked green and ripened by burying it in sand. It will keep for several months without going bad.

X137 *Strychnos pungens* Solered. (5447) Photograph 38.

An eight-foot bent evergreen tree with a spreading crown and paired hard shiny leaves with a sharp spine at the tip. It bears insignificant greenish flowers in compact small bunches in the axils of the leaves. The fruits and the veins in the leaves are similar to those of *Strychnos cocculoides*, and it has the same general distribution. Only one specimen was seen, near the northermost point reached by the expedition.

[262] The fruits contain a pleasant edible pulp which is, however, not considered as good as that of *Strychnos cocculoides*.

Raphionacme burkei N.E. Br. (4997) Photograph 39.

!h5: Bushman........	bi:
ǁganakwe Bushman...	bi:
ǀgikwe Bushman......	bi:
Naron Bushman......	bi:

Nearly all of the plant is six inches below ground, in the form of a rounded storage organ about five pounds in weight and six inches in diameter, slightly flattened on top. It has a brown skin, and is pale yellow inside with flecks of white latex on the cut surface. It is connected by a "neck" a little thicker than a pencil to the above-ground parts, which consists of a few sparingly-branched erect stems, slender but wiry, six inches high and bearing narrow grayish-green leaves. The flowers, which are borne in small clusters, are greenish and inconspicuous, the fruits slender, three inches long and as a rule in pairs. The stems exude a milky juice when injured. They are not easily seen even in summer, and in winter less so, for the leaves are shed and the stems die back.

By the spring there may be nothing left to mark the position of the plant. 137X
How extraordinarily observant the Bushmen are was well shown when they 824
were asked if they could find a specimen and demonstrate its use. One man guided the party for four miles across country featureless except for clumps of trees to a spot where he knew of one growing. It was found after a short search—nothing more than two or three small sticks among the grasses, with the bark shredding into white silky fibres.

Raphionacme burkei is found from South West Africa through the 137X
Bechuanaland Protectorate into the northern Transvaal and the northern Cape. Two specimens were seen in the central Kalahari, and the species was determined from one of them which was sent to Pretoria for cultivation and flowered there in the following summer.

It is a well-known source of water among the Bushmen of the Kala- 271
hari. They extract the water from the storage organ by planing a pile 312
of shavings off it with the edge of a split stick, and then squeezing the 824
shavings in the hand and allowing the water to run into the mouth. This rather roundabout way of doing things appears to be without good reason, because the flesh of the storage organ may be chewed without any ill effect. It is firm and crisp, slightly fibrous, and faintly bitter.

Pentarrhinum insipidum E. Mey. (5171, 5191) Photograph 40. 137X

Eastern !khũ Bushman n!ɔ-ʃu and n!wa-ʃu

A leafy deciduous climber up to 10 feet high, and a vigorous grower which may completely cover the host tree. It has freely branching lax stems which are quite tough in spite of being only a matter of an eighth of an inch in thickness. They are covered with a fine white down which is just perceptible to the naked eye, and when broken they exude a little milky juice, so little that it is easily overlooked. At intervals of about five inches arise pairs of leaves, deeply cordate at the base, and with long stalks. In the younger stages they are minutely hairy but they become glabrous or nearly so as they grow older. The flowers rise in a group on a three-inch slender stalk from between the leaves. They are brownish with a yellow or white central portion, small and faintly scented. The fruits are occasionally produced in pairs but are more usually solitary. They are beaked, three inches long and half as wide, covered with blunt prickles, longitudinally wrinkled and dull green.

At Nama Pan this was a frequent climber among the trees, and it is widespread over southern Africa. It was not, however, seen in the country south of Ghanzi.

At maturity the fruits are hard and woody and packed with the fine 262
silky hairs that form the pappus of the seeds, but when green they are 252
softer and may be eaten raw or cooked as a vegetable, and may be stored for three weeks before they deteriorate. Their rather copious white latex is quite harmless. They have a crisp texture when raw and a pleasant flavour, nutty and faintly peppery. When boiled they are reminiscent of Asparagus. When the seeds inside have turned brown the fruit will be found too hard to make good eating. The leaves, too, may be eaten raw as a salad, and are used that way by some Transvaal Natives, but the Bushmen method of preparation is to pound them to a pulp in a wooden mortar.

Pentarrhinum insipidum grows well from seed and is a rapid producer 137X
of green material. It might be a useful fodder plant for domestic stock.

X137 *Sarcostemma viminale* R. Br. (4993, 5170) Photograph 41.

Eastern !khũ Bushman |gubu|gubu

A leafless climber, reaching a height of 10 feet or so, with gray-green jointed branching stems as thick as a pencil and containing a large quantity of pure white latex. They bear yellowish strongly scented flowers, and fruits shaped like a slender carrot. The plant is occasionally found growing in the open, away from any support, in the form of a dense clump of ascending stems about three feet high.

It is widespread in South West Africa and the Bechuanaland Protectorate, and through the drier parts of all four provinces of the Union.

262 There are records from the Cape Province, Natal and the Transvaal that the stems and fruits of this plant are eaten by the Natives, either cooked as a vegetable or raw as a salad, and I have eaten the raw stems in the Cape Province. They have no distinctive flavour. It is a dangerous plant to eat, for there is a poisonous strain of it which is not visibly distinguishable from the edible one (Dyer, 1937: 123), and which, if eaten in sufficient quantity, causes death after symptoms like those produced by strychnine. The Bushmen said that they never used it for food. I have no information as to its use or otherwise in the central Kalahari, where it also occurs. Presumably it would be safe for food where browsed by animals, which often happens and is easily seen.

X137 *Ceropegia tentaculata* N.E. Br. (5220) Photograph 42.

!hɔ: Bushman........	‖ala
Naron Bushman......	!?aru
Eastern !khũ Bushman	!ama

A twiner up to eight feet high, minutely hairy, with opposite almost fleshy leaves about an inch long rising at intervals of two to three inches. The flowers which are produced on short stalks in a group of half a dozen or so are three quarters of an inch long and tubular, with a swollen base and lobes at the top produced into slender threads. The fruits are paired, four inches long, very slender, gray and filled with seeds attached to a silky pappus. The plant has a tuber a few inches below the surface of the soil, the size of a flattened apple, with a distinct hollow at the top from which the stem rises and with a rounded base which produces many short and slender roots. It is the colour of a new potato.

Ceropegia tentaculata has seldom been collected, and is recorded only from South West Africa. One specimen was found growing in deep sand in the shelter of a thicket about twenty miles south-west of Nama Pan. As it was recognised and named by one of the !hɔ: Bushmen who was with the expedition in South West Africa, it probably occurs also in the Bechuanaland Protectorate in the southern Kalahari, which is the home of these people.

[252 262] The tuber is edible when roasted.

Ceropegia sp. near *Ceropegia leucotaenia* K. Schum. (5309) Photograph 43

Eastern !khũ Bushman |gwi¯ts'ou

The above-ground parts are pubescent, otherwise similar to those of *Ceropegia tentaculata*. The flowers also arise in groups but have a shorter tube, about half an inch long, with the processes of the lobes connected at the tips. The processes are dark brown and covered with slender hairs.

The plant has a shallow tuber which is about as big as a billiard ball but bell-shaped, with fine roots sprouting from the flattened base. It is similar in colour to the tuber of *Ceropegia tentaculata*. 137X

Only one specimen was collected, in the shelter of bushes on sandy loam near Nama Pan. It was cultivated in Pretoria and flowered in January, 1956.

The tuber is edible when roasted. [252 262]

Ceropegia sp. near *Ceropegia lugardae* N.E. Br. (5264) Photograph 44.

Eastern !khũ Bushman n!wi:

In the above-ground parts the plant is like No. 5226 (*Ceropegia* sp. near *Ceropegia mozambicensis*), but it is more leafy and the flowers have a single instead of double swelling at the base. It has a similar bunch of pencil-shaped roots.

One specimen was collected in shallow sand overlying rock at Nama Pan. It flowered in cultivation at Pretoria at the end of March, 1956.

The roots are edible when roasted and in texture and flavour like those of No. 5226. [252 262]

Ceropegia sp. near *Ceropegia mozambicensis* Schltr. (5226) Photograph 45.

|hɔ̃: Bushman........	,gu:_n||a
Naron Bushman......	,gu:_n||a
Eastern !khũ Bushman	_n||ɦama

A twiner with very sparsely hairy stems and leaves similar to those of *Ceropegia tentaculata*. The differences are that the flowers are borne in pairs on a peduncle about one inch long, one flower maturing long before the other, and that the flowers have a double swelling at the base and at the top are broadly funnel-shaped, with erect folded dark brown broad lobes connected at the tips and edged with sparse hairs. The tube is greenish, spotted with purple. The stem arises from a bunch of pale fleshy roots about six inches below the surface of the soil, the size of pencils but tapering at the ends and constricted at the top so that they are easily broken off.

Only one specimen was seen. It was growing in the shelter of a thicket on deep sand about 20 miles south-west of Nama Pan. It flowered in cultivation in Pretoria in January 1956.

The roots are edible when roasted. They taste somewhat like a potato, but are firmer and have a flavour of their own. They have no fibre and the plant would be worth investigating for improvement and cultivation as a vegetable. [252 262]

Duvalia polita N.E. Br. (5187) Photograph 46.

Eastern !khũ Bushman ⁻da:daba

A sprawling succulent plant. The fleshy stems are glabrous, uniformly gray-green and four inches high, with usually six longitudinal rows of soft spines with a deep crease between each row. They rise from underground runners which are white and lack the distinct spininess of the stems. The corolla-lobes surround a prominent fleshy basal ring, and are dark brown, sometimes with vibratile hairs similar to those of *Caralluma knobelii* and sometimes irregularly flecked with yellowish-green. The

Y137 specific name, which means *polished*, refers to the shiny appearance of the corolla-lobes towards the base. The fruits, borne in pairs, are between a half and a quarter of an inch in thickness and six inches long, tapering at the end and containing numerous flattened seeds with a silky pappus.

Although it has a wide range across tropical and sub-tropical Africa, it is uncommon; and only one specimen was collected on the expedition, under the shelter of scrub at the edge of a rocky outcrop at Nama Pan.

[252 262] 312 The stems are edible raw or roasted, but have a bitter taste. They are sappy enough to be a useful source of water.

Caralluma knobelii (Phill.) Phill. (5094, 4914) Photograph 47.

!hɔ̃: Bushman........	-≠aberɛ
ǁganakwe Bushman...	-da:daba
ǀgikwe Bushman.......	-da:daba
Naron Bushman......	-da:daba
Eastern !khû Bushman	-da:daba

The plant consists of a number of stubby, succulent erect stems four inches in height and half an inch in diameter. They are glabrous and dull bluish-green, mottled faintly with a darker green and square in section, with four rows of sharp and fairly hard-tipped spines. They exude a clear greenish juice when cut. The flowers are white to greenish, with dark purple blotches and edged with sparse delicate knobbed hairs known as vibratile hairs because of the way they are moved about by even the gentlest breeze. The stems arise from underground runners which have the same form as the erect stems except that they are white, and more slender.

This species, which is known only from the Kalahari, was found in various places on deep sand between Molepolole and Ghanzi, but was nowhere common. It was in the shelter of trees and scrub, and was not seen in the open.

[252 262] [312] The whole plant is edible raw or roasted, but the underground portions are better than those above ground, which tend to become bitter. They have a peculiar smoky flavour which is not unpleasant, and their abundant juice makes them a useful source of water.

Stapelia kwebensis N. E. Br. (5140) Photograph 48.

Eastern !khû Bushman -da:daba

Similar in habit to *Caralluma knobelii*, but with dull green downy stems and rounded instead of sharp corners. The spines too are shorter and tipped with small erect leaves. It has dark brown flowers with slender lobes ridged on the upper surface and radiating out from a shallow central pit.

Only one specimen was collected on the expedition, on a rocky outcrop at Gam, but the species is widely distributed in South West Africa except in the extreme south and it is known from the northern Transvaal as well.

[252 262] The stems are edible, raw or roasted.

Fockea sp. (5136, 5236).

Eastern !khû Bushman ʼ!xwa:

One of the two specimens collected was in the open among rubble at the edge of a sheet of rock at Gam, a plant with fleshy stems 12 inches high, and the only one of its kind seen in that vicinity. The other specimen was growing with several more in stony scrub-covered ground near Gautscha Pan, and appeared similar except that the stems were thicker and were twining to a height of several feet among the other bushes. The leaves drop during the winter, but a few were still to be seen, linear, 137X paired, and about three inches long and half an inch wide, and there was one fruit, as long as the leaves and shaped like a small cigar. The stems rise from a brown-skinned underground storage organ which may be more than a foot in length and up to five inches in diameter. It is often oddly shaped if growing in rocky ground, as these all were, and has a rather spongy texture, a combination which makes it difficult to dig up without damage. Several were brought in at a Bushman encampment about 20 miles south-west of Nama Pan, but none of them were entire. The specimens I collected were lost in transit to Pretoria, and though they could be placed in the genus Fockea from what had been seen in the field, the species is unknown.

The storage organ is eaten raw by the Bushmen. The flesh is white [262] and rather flabby, with a faint but pleasant flavour of coconut ice. As [312] well as being a food it is juicy enough to be a useful source of water. It could possibly be bred into a plant worth cultivating.

Ipomoea verbascoidea Choisy (5223, 5319) Photograph 49.

Eastern !khû Bushman n!ɔru

Tubers and seeds of this species failed to grow in cultivation in Pretoria. The notes which follow were made partly from herbarium specimens, for the plants were quite leafless when they were seen in the field in August. They were conspicuous in spite of their bareness, because of the small pure white masses of wool in which the seeds were embedded. These masses were scattered along numerous slender twigs that arose from a group of sturdy, cane-like stems, half an inch thick and eight feet long or more. The stems are scramblers, or, if no trees are at hand, lax and spreading. They exude a little milky juice when cut. The stalked leaves are simple, rounded, and up to four inches across, and bear in their axils single large purple flowers of the typical Convolvulaceous (morning glory) type. The plant is covered with a white wool except on the upper surface of the leaves, where it is sparsely hairy.

Two plants were seen on the expedition, both in the neighbourhood of Nama Pan, and both on sand and among fairly dense mixed scrub. There are records of the species from South West Africa, the Bechuanaland Protectorate and Angola.

A note on one of the herbarium specimens states that the fruits are [262] edible, but this was not mentioned by the Bushmen. They did however 312 state that the storage organs were used as a source of water. These are six inches below the soil, sometimes partly exposed and partly eaten by animals. They are firm and juicy, and those seen were the size of a football, with a white flesh and a dark brown skin. The water may be [271] extracted by chewing the flesh or by pounding it and squeezing the pulp.

Ipomoea sp. (5179) Photograph 50.

Eastern !khû Bushman !garubɛ 137X

A slender plant with three or four bluish-reen leaves up to three inches long, borne on a four-inch erect stalk and themselves erect, and deeply and narrowly lobed. There are usually three or four tubers to each plant. They are found at any depth down to nine inches, and are variously shaped but regular in outline, typically the size and shape of a large apple with a slight depression on top, where they are connected at intervals of

X137 a foot or so to an underground stem which branches and turns unexpectedly in various directions. They have a thick brown skin with a bronzy sheen, are slightly bitter to the taste and exude a little latex when the skin is broken. No flowers were seen in the field, and although specimens cultivated in Pretoria made good growth, they did not produce flowers. No fresh leaves were seen in the field either. They are evidently very susceptible to the cold, for it was noticed that the cultivated specimens dropped theirs before the first frosts.

Fragments of this plant which had been killed by frosts were scattered plentifully through the open grassy sandy areas near Nama Pan, and the tubers were often unearthed while other plants were being dug up.

[262] The Bushmen stated that they did not eat the tubers, but that they were eaten by buck.

The leaves of this plant cannot be distinguished from the leaves of *Ipomoea bolusiana*. *Ipomoea bolusiana* is known to have an edible tuber (Schinz, 1888: 271, Boss, 1934: 87), and from the available herbarium specimens and the literature it appears that it is single, and immediately below the surface of the ground. Because these two facts are in conflict with what was seen and what was reported by the Bushmen, it is doubtful whether the plant from Nama Pan is the same species.

Ehretia rigida (Thunb.) Druce Photograph 51.

!hɔ̃: Bushman........	ǁga
ǁganakwe Bushman...	ǁgawu
ǀgikwe Bushman......	ǁga
Naron Bushman......	ǁga

A shrub, usually about six feet high, with a pale gray bark, a rigid, erect habit and a mass of branches, which in older plants spread out and turn downwards to give a "weepy" appearance. New growth is straight and smooth, and there is a very fine rusty wool on the youngest twigs. It contrasts strongly with the older growth, which is usually knobby and crooked and quite glabrous. The leaves are elliptic or obovate, stiff, minutely hairy and shortly stalked. They are scattered evenly along the new growth, but on the old growth they are crowded on dwarf shoots averaging an inch in length. Their dull green colour makes the plant rather unattractive, but it can become showy when the small blue or white flowers are out. The fruits are the size of a pea, soft and red when ripe and often with the withered remains of the style persisting.

Ehretia is found in all four provinces of the Union and in South West Africa, the Bechuanaland Protectorate and Rhodesia. It was scattered through the Kalahari south of Ghanzi but was not recorded in the north, and was never common and never gregarious.

[262] The fruits may be eaten raw when ripe, but are insipid, with a sickly-sweet taste and a faint and rather unpleasant flavour.

Rhigozum brevispinosum O.Ktze. (4946, 5255).

!hɔ̃: Bushman........	ˏǁha:
ǁganakwe Bushman...	n|ɔ‾ji
ǀgikwe Bushman......	ˏt'a:
Naron Bushman......	ń|ɔ‾ji

An erect, slender deciduous shrub up to 10 feet high, with opposite branches and opposite blunt spines which develop into branches like the spines of *Catophractes alexandri*. There is a small tuft of wool below each spine, from which is produced a bunch of six or eight leaves an inch long and less than a quarter of an inch wide. No flowers were seen on the expedition, but from herbarium records it is known that they are yellow and tubular and produce papery pods two inches long and half an inch wide. The pods split down their centre when they are mature. 137X

This plant is known from the northern Cape, the Bechuanaland Protectorate and South West Africa, and was widespread and fairly frequent north and south of Ghanzi.

Although it is not an edible plant it is nevertheless a producer of food, for all the Bushman digging-sticks seen were made from it. The only preparation is that the bark is peeled off, the spines trimmed, and one of the ends cut at a slant. The stick is about four feet long. In sandy soils and for the type of digging usually required it is a more efficient tool than a spade. It may be made to loosen a narrow cylinder of earth, and this cylinder, if a little wider than the object sought, is all that is necessary. With a spade on the other hand it is usually impossible to avoid a funnel-shaped excavation which entails the removal of far more soil. 322 412 824

Catophractes alexandri D. Don (4893) Photograph 52. 137X

!hɔ̃: Bushman........	n!ain!ai
‖ganakwe Bushman...	!ga:!gaba
ǀgikwe Bushman......	ga:giba:
Naron Bushman......	n!ain!ai

A five-foot erect silvery bush with opposite leaves, some brightly coloured in the autumn and winter. They often bear slender sharp spines in their axils, which afterwards develop into branches and bear leaves and spines in their turn. The leaves and younger woody parts are covered with a dense white wool, but this afterwards disappears from the woody parts and they become a reddish brown. The flowers, which are about two inches long, are white, trumpet-shaped and showy, and produce a pod covered with short blunt prickles and up to three inches long, dark and woody when mature and splitting down the centre. The seeds have a circular membranous wing round them.

The plant is recorded from Angola, South West Africa, Southern Rhodesia, the Bechuanaland Protectorate and the Transvaal. It was fairly frequent south and north of Ghanzi, in patches down the banks of pans, on limestone, and occasionally also on slight slopes in sandy country.

Catophractes alexandri is not a food plant but deserves mention because of its importance in the preparation of food—it is used as a fire-drill together with *Grewia retinervis*, as is described in the notes on that species. 372 412 824

Corallocarpus sphaerocarpus Cogn. (5020, 5138, 5230) Photograph 53. 137X

ǀgikwe Bushman......	ǀhurugu
Naron Bushman......	ǀhɔrɔ
Eastern !khû Bushman	ǀhɔrɔ

A very variable plant creeping by means of tendrils over shrubs and low trees, and with sparse leaves, dissected or lobed and rough to the touch, rising in groups or singly from nodes on the rather sappy stem. The leaves are not flat even when perfectly fresh, but inrolled slightly at the margins as though they were beginning to wilt. Three or four sessile half-inch ovoid fruits are borne in a cluster at the nodes as well, which in

X137 older stems often form the points of characteristic zig-zags. The fruits are red when ripe and contain about five seeds. They open by means of a latitudinal break (circumscissile dehiscence) so that the skin at the end of the fruit comes off like a cap. The central jelly-like portion of the fruit, which has the seeds embedded in it, often remains behind when the cap is removed. The plant is deciduous, and the vine dies back if the winter is severe. It arises from a pale brown rootstock the size and shape of a large pear, which in the three specimens collected was partly above the level of the ground.

Its range is from the northern Cape Province, the Transvaal and Zululand through to Rhodesia and South West Africa. It was collected south of Ghanzi and again in the neighbourhood of Gautscha Pan, but was nowhere common. It is a woodland plant and does not occur in the grasslands.

[262 252] The fruits are sweetish and edible when ripe. The rootstock is bitter and is not eaten, but the stems and leaves are boiled to produce a spinach which is fairly palatable, but stringy. It is eaten also by certain Natives in the northern Transvaal.

Corallocarpus welwitschii (Naud.) Hook. f. (5315) Photograph 54.

Eastern !khũ Bushman !gwara!ai

The fruits of this plant have a short but fairly distinct stalk, and its rootstock has a faint unpleasant smell when freshly dug. In all other respects it appears to be identical with *Corallocarpus sphaerocarpus*.

It has been recorded from the Bechuanaland Protectorate and South West Africa, but so far not from the Union. The only specimen found on the expedition was growing in sand under trees at Nama Pan. It grew well in cultivation at Pretoria.

[262 252] There is no information on the edibility or otherwise of the vine, but the ripe fruits may be eaten raw. They are sickly sweet and flavourless. The Bushmen stated that the rootstock is edible after being cooked, but I found it too bitter to eat.

Momordica balsamina L. (4929, 4970, 5003) Photograph 55.

A climber over grass and low bushes or a runner over the ground, with sharply-lobed light green leaves about two inches across arising singly at intervals of a few inches along the numerous lax, slender stems. It has three-inch spiralling tendrils rising at the bases of the leaves. It is glabrous, with a soft, attractive look, but has a strongly unpleasant smell when bruised, The flowers are an inch across, pale yellow and after the usual Cucurbitaceous pattern as shown in the photograph of *Coccinia rehmannii*. The fruits, green when immature, are an attractive orange when ripe, one and a half inches long and an inch in diameter, with about ten longitudinal rows of short blunt prickles, and contain half a dozen seeds enveloped in a crimson pulp. The skin of the ripe fruit splits longitudinally and almost explosively when it is handled. The plant is an annual according to the *Flora Capensis*, but those in the Kalahari remained alive through the winter and put out fresh vines in the early spring to replace the frosted growth of the previous season.

It has been recorded from the four provinces of the Union and from Portuguese East Africa, the Bechuanaland Protectorate and South West Africa, and although it was not noticed north of Ghanzi, it was widespread to the south.

The fruit, according to the label on one of the herbarium specimens, is "very poisonous", but there appears to be no satisfactory proof of this. The Bechuana state that the crimson pulp round the seeds is edible, and I ate it without any harmful effects. It is sweetish but has a rather unpleasant slimy texture. [317X [262]

Citrullus naudinianus (Sond.) Hook. f. (4983, 4984, 5272) Photograph 56.

!hɔ̃: Bushman........	ǁgan
ǁganakwe Bushman...	gã:
ǀgikwe Bushman......	gã:
Naron Bushman......	gã:
Eastern !khû Bushman	tʃa

This vine, commonly known as the Gemsbok komkommer, is a runner on the sand and not a climber. It has a tap-root the shape of a large carrot, which may be three inches or more in diameter at the top and three feet long, and which grows hard and woody with age. The younger roots are full of juice and intensely bitter, and cannot be eaten by human beings, although many showed signs of having been eaten by animals. The runners, which may reach a length of 30 feet, are stouter than those of the related *Cucumis hookeri* and No. 4895 (see page 50), and unlike them and those of *Citrullus vulgaris* are fairly frost-resistant. Many were still green during the heavy frosts experienced on the expedition, and were even putting out fresh leaves. They often have a zig-zag growth form and may root at the nodes. Apparently they die back after a few seasons, for live and dead runners were common. The leaves, borne on a one-inch or two-inch stalk, are dull green, lobed, very rough to the touch, and between two and four inches long. A stout slightly hooked tendril rises at the base of each leaf and is usually about as long as the leaf-stalk. The fruits vary in shape from ovoid to nearly spherical, and weigh about half a pound. The skin is covered with thick soft spines a quarter to half an inch long, and is pale yellow when the fruits are ripe. They can stand heavy frost without spoiling, and are eaten by many different animals.

The plant has been recorded from the sandy parts of the north-western Cape Province and Orange Free State, the Transvaal, the Bechuanaland Protectorate, South West Africa, Angola and Northern and Southern Rhodesia. On the expedition the runners were common between Molepolole and Ghanzi but the fruits, in tens or in hundreds, were in patches sometimes many miles apart. The plants were not found on the firmer "pan" soils and were much less common north of Ghanzi.

The fruits have a thin rind containing numerous flattened white seeds [262] embedded in a green translucent jelly-like flesh which may be eaten raw [252] or roasted and has a distinctive, slightly rank flavour. The pips and skin are often roasted separately and pounded to make en edible meal. As a [312] source of water this plant comes next in importance to *Citrullus vulgaris*, but like *Citrullus vulgaris* (and *Cucumis hookeri*) it cannot be depended upon where there have not previously been adequate rains, for the water in its perennial tap-root is not in itself enough to produce a crop of fruit.

Citrullus naudinianus has possibilities as a cultivated plant.

X137 *Citrullus vulgaris* Schrad. (4937, 4999) Photograph 57.

!hõ: Bushman........	dam
||ganakwe Bushman...	n||an
|gikwe Bushman......	n||an
Naron Bushman......	n||a–ī
Eastern !khũ Bushman	_t'a_ma

This plant, one of the melons and commonly known as the tsama, has stout six-foot vines half an inch in diameter at the base and a quarter of an inch at the tip. They are covered rather densely with light brown hairs, which turn white and stiff with age. The vines are usually prostrate, but occasionally festoon themselves over grasses and low shrubs with the help of small Y-shaped tendrils, curly at the tips. The leaves are borne on two-inch stalks and are hairy on the ribs, dull green, rough to the touch and deeply lobed. Each plant produces male and female flowers. They are an inch in diameter and pale yellow, and the fruits which follow are rounded and up to six inches in diameter and six and a half pounds in weight. As many as 34, of all sizes, have been counted on one plant. The rind, densely hairy when young but later quite smooth, is dark green mottled longitudinally with light green, and contains a crisp, juicy, tasteless white flesh in which numerous flattened brown seeds are embedded. The melons can endure heavy frosts without becoming spoilt, but the rest of the plant is very susceptible. The frosts, however, merely hastens its death for it is in any case an annual.

This melon is indigenous to south-west Asia and the warm dry regions throughout Africa. The water-melon is merely an improved variety of the same species, which has been known in Egypt and Babylonia since the beginning of history (Marloth, 1913-1925: III: II: 205). The tsama was widespread but patchy along the route of the expedition, and areas of abundant melon alternated with long stretches where it was not seen. It was not confined to the sand but grew also on the hard soil of the pans.

262 The tsama is unquestionably the most important plant to the Bushmen
312 in this part of the Kalahari. They are known to use it as their sole source
824 of water for months on end and it is extremely doubtful whether they would
be able to live permanently in the Kalahari without it. Its importance is
[184] shown by the fact that one group of Bushmen in the central Kalahari had
[244] a small patch of tsama which they had grown from seed, and the Bushmen
are not as a rule agriculturalists. Nevertheless, the tsama is not an infallible standby, for the reasons given in the discussion on *Citrullus naudinianus,* and when the need arises the Bushmen can and must substitute more meagre but at the same time more reliable sources of water, for example from *Sansevieria scabrifolia.* When it is used for drinking-water
252 the melon is opened at the top like an egg and the central portion cut out
262 and eaten. The rest of the pulp is then mashed inside the rind with a
312 stick to a watery mass which is half drunk and half eaten, the pips being put aside and later roasted and pounded (without being peeled) to make an edible meal. The melons are sometimes roasted before being eaten, which adds a little flavour, and they may be cut up and mixed with meat to form a stew, which is conveniently cooked in the rind itself. Although no bitter specimens of the tsama were found along the route of the expedition, they do occur. Their flesh is poisonous and unfit for human consumption, but their seeds are free of poison and edible after roasting.

000 At some villages of Bakalahari (which are a Bantu tribe), the tsama is regularly cultivated. These and wild melons are collected and stored under shelter, and goats, horses, cattle and even dogs are kept with tsama as the main source of water. The livestock use the melon more economi-

7:Story N-5 (1955) 1958 FX10 Bushmen FX10

cally than the Bantu and Bushmen do, for they eat the rind as well. Large 000 animals, and this according to Livingstone (1857: 48) includes the carnivora, are able to broach the tsama rind unaided, but evidently the smaller / animals do not find this easy, for many tsamas were seen with the marks of teeth on them, showing where animals had attempted unsuccessfully to reach the pulp inside. As for the rodents, whose burrows were [illegible] the thousand all through the central Kalahari, they are well [illegible] for making holes in the rind, and apparently have little difficulty, for hollowed-out tsamas were frequently seen.

Cucumis hookeri Naud. (5012, 5028, 5047) Photograph 58. 137X

!hɔ̃: Bushman........	n≠ɔʔnu
Naron Bushman......	n≠ɔʔnu

An annual vine with slender straight stems up to six feet long, and a shallow spreading root system. It produces tendrils and may occasionally trail over low shrublets and tufts of grass, but normally it is a runner over the surface of the sand. All parts are covered with minute stiff white hairs, which are densest on the leaves, particularly on the under surface, and make them rough to the touch. They arise singly at intervals of up to four inches, vary from one to three inches in length, and are dark green with large rounded lobes, and stalks up to one and a half inches long. The tendrils arise at the base of the leaves. They are an inch long and are tightly curled at the tip. Both male and female flowers, borne on the same plant, are yellow and trumpet-shaped with triangular petals, and an inch in diameter. The fruits are the size of a hen's egg, brown with six or seven longitudinal lighter stripes and covered with soft but fairly stout prickles, the flesh being green, transparent and almost jelly-like, with the smell of cucumber.

This is a widespread species through the drier and sandier parts of the northern Cape, the Transvaal, Southern Rhodesia, the Bechuanaland Protectorate and South West Africa. It was found all along the route of the expedition in the open grasslands, and sometimes in great abundance. The fruits were undamaged although the leaves and runners had been killed by frost by the time the expedition passed through the Kalahari.

The fruits have a slightly sour taste but are good to eat, and as they 262 have none of the thick white layer of firm flesh which surrounds the pulp of the cultivated cucumber they contain proportionately more moisture and are a useful source of water. Bitter fruits are known to occur in some strains of this species and are to be avoided, not only because of their unpleasant taste but also because they are poisonous.

Cucumis metuliferus E. Mey. (5098) Photograph 59. 137X

An annual climber over trees and shrubs with angled, sometimes almost winged 10-foot vines thickly covered with stiff brown hairs and bearing the leaves at intervals of three inches or so. The leaves, which are covered with similar hairs, have three or four rounded or acute lobes and small teeth along the margins. They are up to three inches long and arise from a two-inch stalk, at the base of which is a tightly-spiralling tendril. The flowers are trumpet-shaped, yellow and, including the small triangular petals, about an inch across. The immature fruits are dark green mottled with lighter green. They ripen during the winter and are then bright orange, five inches long and half as wide, and armed with hard and exceedingly sharp spines which can injure the skin if carelessly handled. They have a thin rind covering a green transparent flesh in which the seeds are embedded.

X137

The plant is widely but scantily distributed through the northern and eastern Transvaal, the Bechuanaland Protectorate, South West Africa and Rhodesia. One specimen was collected near Tsau.

Edible and bitter varieties of this cucumber are known, but there is no way of distinguishing them except by experiment. The specimen from Tsau had inedible fruits, not because of any noticeable bitterness but because of a most disgusting flavour which persisted in the mouth for an hour or so after a small piece had been tasted. Miss I. C. Verdoorn of the Division of Botany informs me also that the spines are soft on the fruits she has examined, and it is possible that No. 5098 is, because of its hard spines and bad taste, a distinct strain.

Cucumis metuliferus is cultivated in various countries under the name of Jelly Melon.

Cucumis sp. (4895, 4986, 5027, 5320) Photograph 60.

!hõ: Bushman........	n‖am
ǁganakwe Bushman...	umn‖i
ǀgikwe Bushman......	kwamn‖i and ‖gam
Naron Bushman.......	n‖am
Eastern !khõ Bushman	huru and uru

A vine with slender prostrate straight stems about six feet long. The whole plant is rough to the touch from a covering of hairs similar to those of *Cucumis hookeri* and distributed in the same way, and it has the same type of tendrils and the same habit. In size, shape and spacing the leaves vary somewhat, but the margins appear to be consistently rather jagged. Male and female flowers are alike in size and shape, and yellow. They are borne on different plants. The fruits are extraordinarily like those of *Cucumis hookeri*, but they have about ten longitudinal gray stripes instead of six or seven, prickles tending to curl over more at the tips, and more of them, the proportion being about 324 to 186. The seeds, too, are bigger. The fruits tested were intensely bitter without exception. The roots of the many female plants investigated were pale brown, about two feet long and less than a quarter of an inch thick, and bore a thickened storage organ at the end which varied according to its age, being the size and shape of a short candle when young and like a large potato when old. The runners radiate out from a central root and in turn send down roots at intervals, and although the intervening parts wither and die during the winter the roots themselves appear perennial, and probably form new plants, for a root sent from the Kalahari grew into a flourishing plant in Pretoria the following season. As the vines had been frosted and had partly disintegrated when these plants were studied in the field, I could not establish whether the male plants had the same root system. This is, however, probable, because the same root system was found on many vines which were not bearing fruit.

This plant has seldom been collected and is apparently undescribed. It is represented in the National Herbarium by only three other specimens apart from those collected on the expedition. It was found in the central Kalahari (where it was sometimes abundant) and also in the north near Gautscha Pan, and, like *Cucumis hookeri*, in open grasslands. It was seen only on deep sand. No estimate of the relative abundance of this species and *Cucumis hookeri* can be made in the winter without careful investigation because of the similarity of the two when once their leaves have gone.

The storage organs[1] are firm but juicy and may be eaten raw or cooked. The flavour is pleasant, rather like that of a turnip, and if they are eaten raw they are a valuable source of water. They were an important article of food to the Bushmen we met in the central Kalahari, and the plant would be worth investigating with a view to cultivation after improvement through breeding. 262 [252 312]

Coccinia rehmannii Cogn. (4954, 5029). Photograph 61. 137X

!hɔ: Bushman........	mʘwajé:
‖ganakwe Bushman...	|ga:
|gikwe Bushman......	|ga:
Naron Bushman......	|ga:
Eastern !khû Bushman	|ga:

A vine, climbing by means of tendrils to a height of six or eight feet, and bearing on half-inch petioles a dense growth of dark green leaves which are deeply and irregularly lobed and very variable in size and shape. They have a rough texture from minute scattered white hairs, more numerous on the upper surface and pointing forward. The stems are slender and angled, and bear a few of these hairs also. The plants are either male or female, and both male and female flowers are trumpet-shaped with short triangular petals, pale yellow and three quarters of an inch across. The fruits are three quarters of an inch long, with a bulbous base and a rather thick neck, green mottled with white when immature and red when they ripen in the autumn. The old stems die back during the winter and new ones are produced the following spring from a perennial tuber buried about four inches below the surface of the ground. The tuber tapers gradually when young, but thickens and assumes various shapes as it grows older, and the bark, from being smooth, becomes rough and fissured. It does not "bleed" if injured superficially, but from deep injuries it exudes a clear astringent mucilage.

Specimens on the expedition were found not in the open grasslands, but always growing in shelter under a bush or in a thicket. It was midwinter and they were dormant, represented above ground by a few fragments of dry and leafless stringy stem among the twigs of the sheltering tree, and in consequence exceedingly difficult to find. Even after the presence of the plant had been established the finding of the tuber presented difficulties, for the connection with the vine overhead was often broken. The plant appeared to be occasional but widespread in the parts through which we travelled, and three tubers, all of which were successfully cultivated in Pretoria, were collected in different parts of the Kalahari. It is recorded also from the Cape Province, the Transvaal and South West Africa.

Besides providing food, the tubers are sappy enough to be a useful source of water, but they must be roasted first for they cannot be eaten raw. Older woodier tubers are best boiled, but even so the fibre is so tough that it is ejected after being chewed. At all stages the tubers are rather tasteless. They are known also to the Natives in some parts of the Transvaal, and eaten by them, but in this land of relative plenty they are not a popular food. The fruits also are edible, but rather sickly sweet and flavourless. Doubtless they are used by the Bushmen, but I failed to ask them. 252 262 312

[1] [CUCUMIS; SEE CATEGORY 116, P.50 FOR DESCRIPTION --ANALYST]

X137 **_Coccinia sessilifolia_ (Sond.) Cogn. (5167) Photograph 62.**

Eastern !khũ Bushman ¯kʼl:dwa

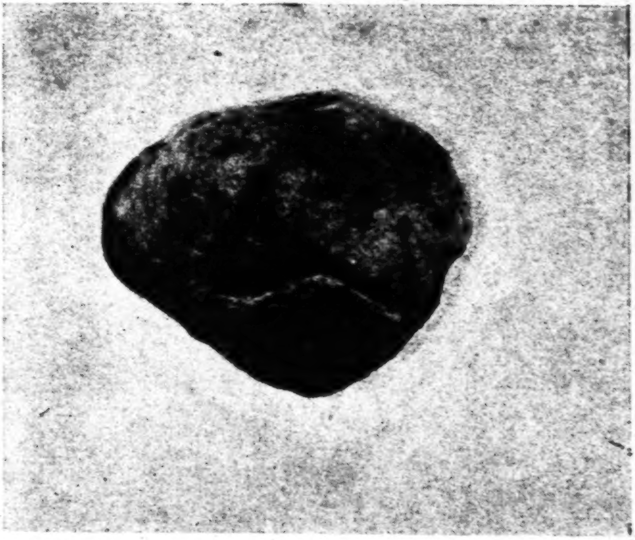
A vine with many slender stems and bluish-green sessile leaves, deeply and irregularly lobed but usually less so than those of *Coccinia rehmannii.* The are covered with tiny raised scales on the upper surface, which sometimes show through on the lower surface as dots, and although hairs are present they are nearly all confined to the margins and too small to be seen by the naked eye. The tendrils are produced at the base of the leaves. Male and female flowers are borne on different plants. They are superficially alike, and similar to those of *Coccinia rehmannii.* The fruits are ovoid, three inches long and one in diameter, and are bright red when ripe. The leaves drop during the winter, and the vines also wither and disintegrate, but fresh ones arise in the spring from a perennial tuber weighing up to 25 pounds or so and similar in all respects to the tuber of *Coccinia rehmannii.*

Although the plant has a wide distribution on a variety of soils in the Cape Province, the Orange Free State, the Transvaal, the Bechuanaland Protectorate and South West Africa, it was not seen on the expedition until Nama Pan was reached, where it was growing under the shelter of trees in sand. Two tubers, which happened to be male and female respectively, were sent to Pretoria, and flowers and fruits were produced in the summer of 1955-56.

262
252 Both tuber and fruit are edible. The tuber, which is prepared by roasting or boiling, is fibrous and rather tasteless. The fruits may be eaten raw when ripe, and although sweet are without much flavour. They are best used for food when gathered green and cooked as a vegetable. Their texture is then fairly firm and their flavour like that of Asparagus. [136] An added advantage of using them green is that one avoids the larva of a certain fly which, in Pretoria at any rate, often heavily infests the more mature fruit.

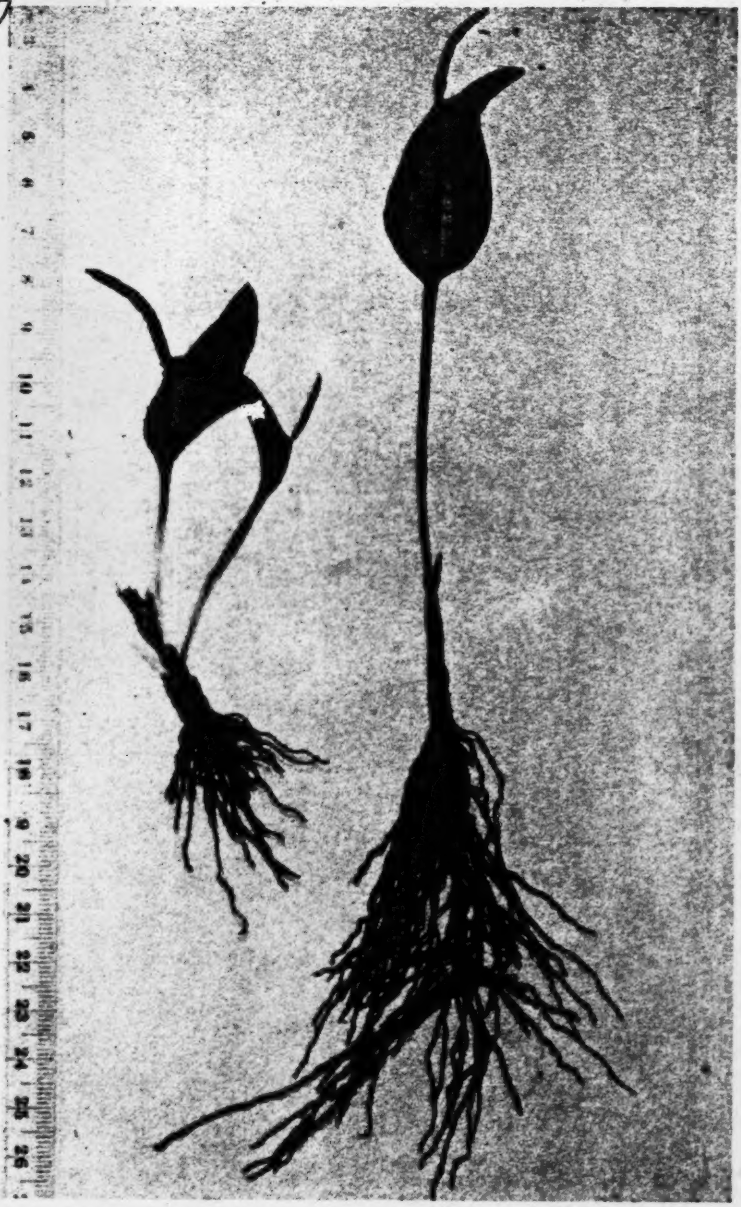
114
X137 It is of interest to note that although there is a record in the National Herbarium that birds eat the fruit and that the tubers are dug out and eaten by buck, there is no record of the fact that the plant is eaten by human beings. On the contrary, the information on one specimen is "Fruit is very poisonous to children" and on another "Toxic".

x137

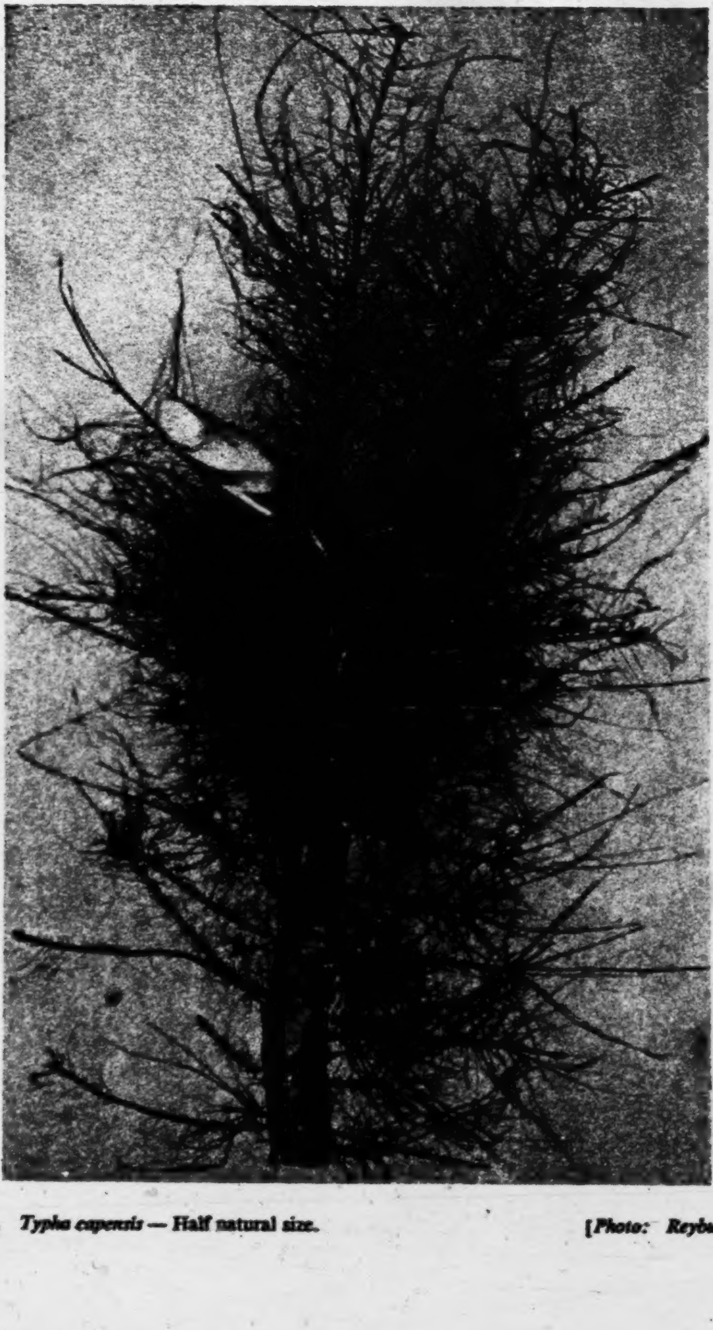


1. *Terfezia* sp. [*Photo:* *King*.

x 137

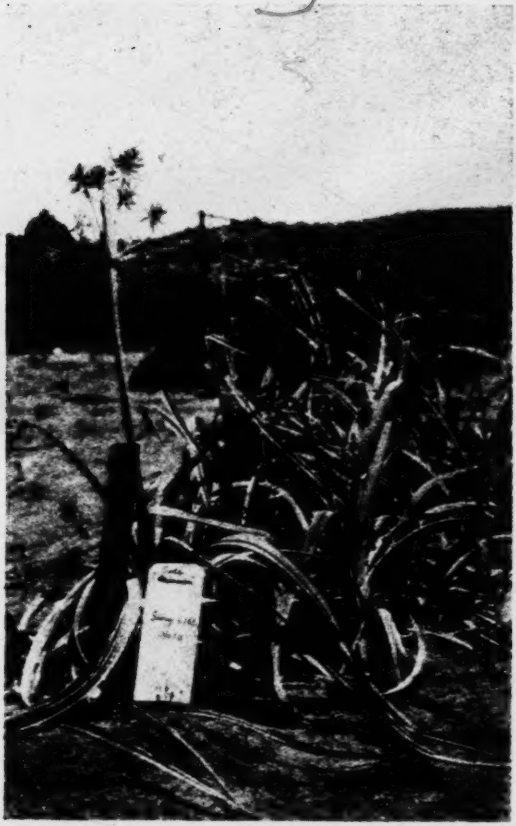


2. *Ophioglossum sarcophyllum.* [*Photo: Reyburn.*



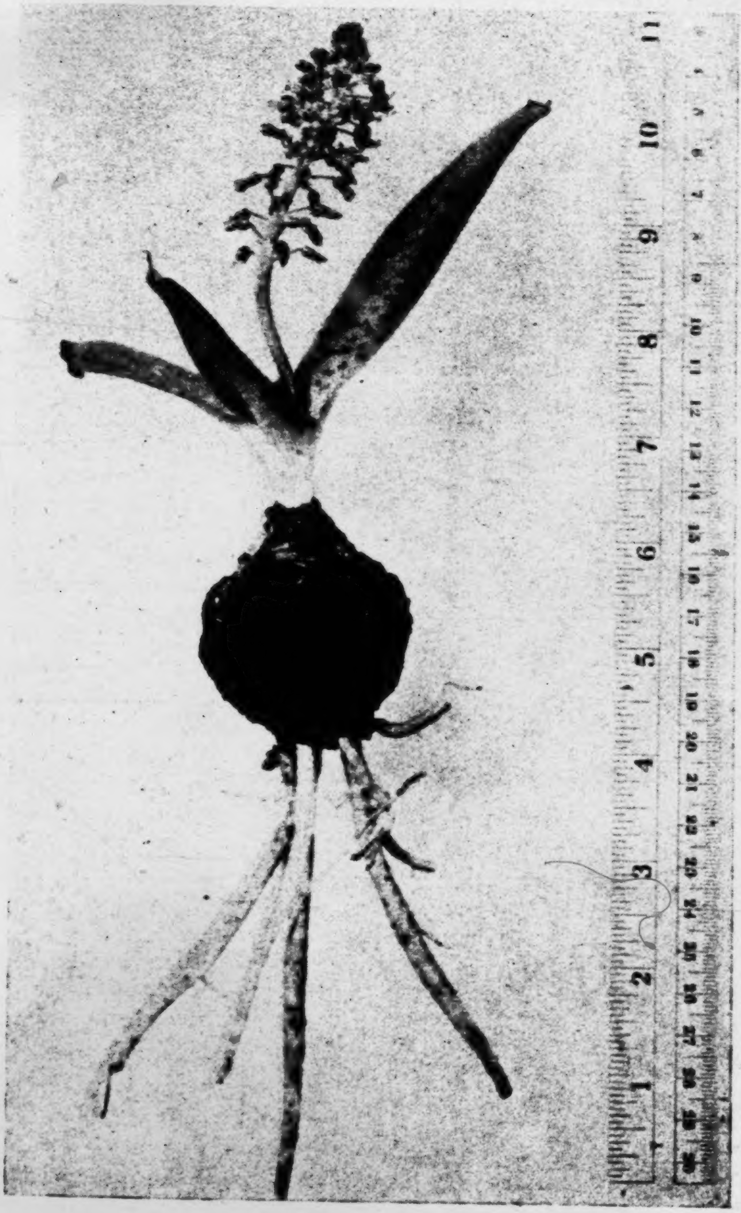
3. *Typha capensis* — Half natural size. [*Photo: Reyburn.*

X 137



4. *Mariscus congestus.* [Photo: *Story.*

137X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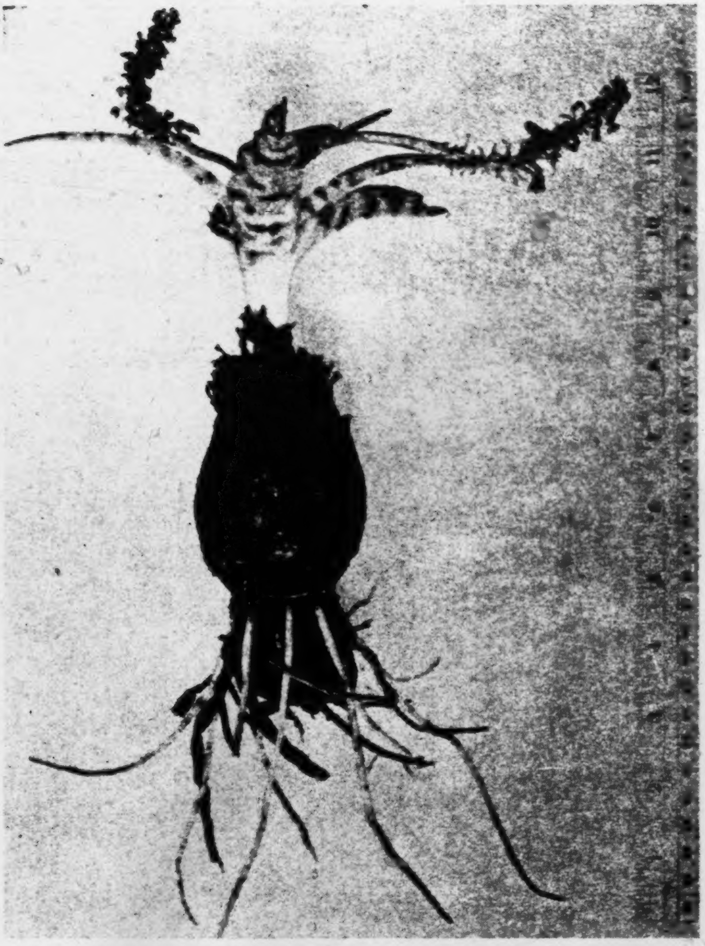
5. *Scilla* sp. (5190)

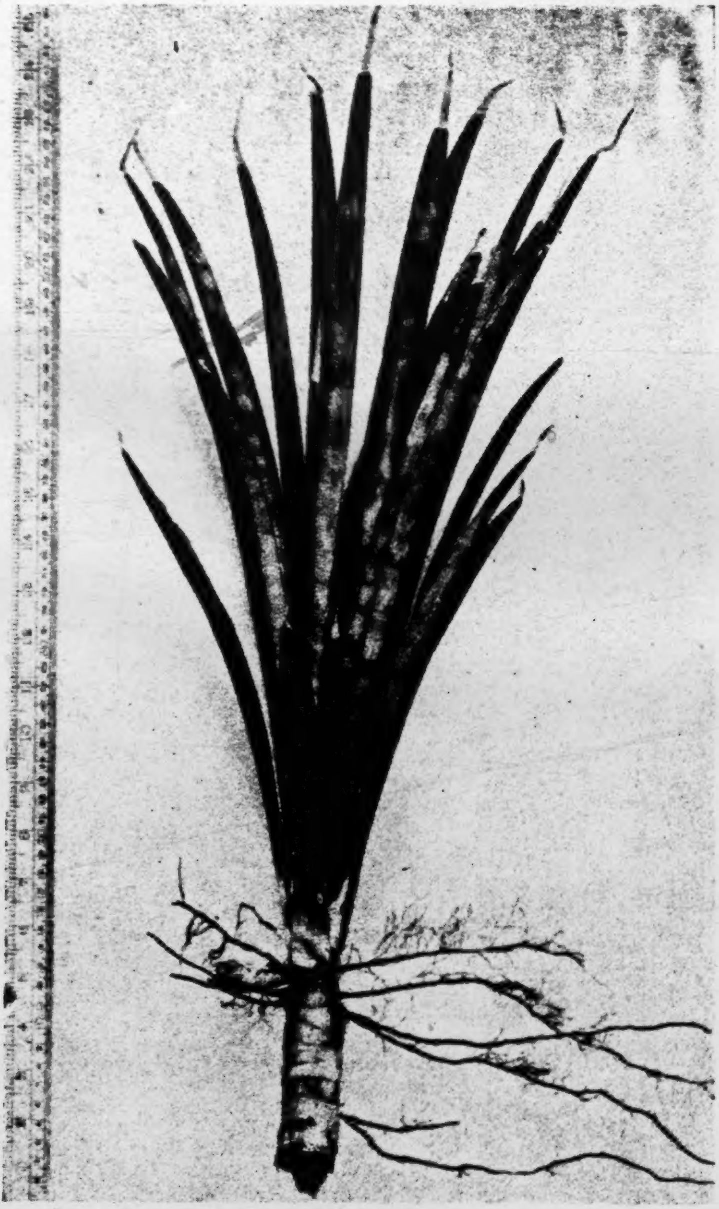
[*Photo: King.*

137X



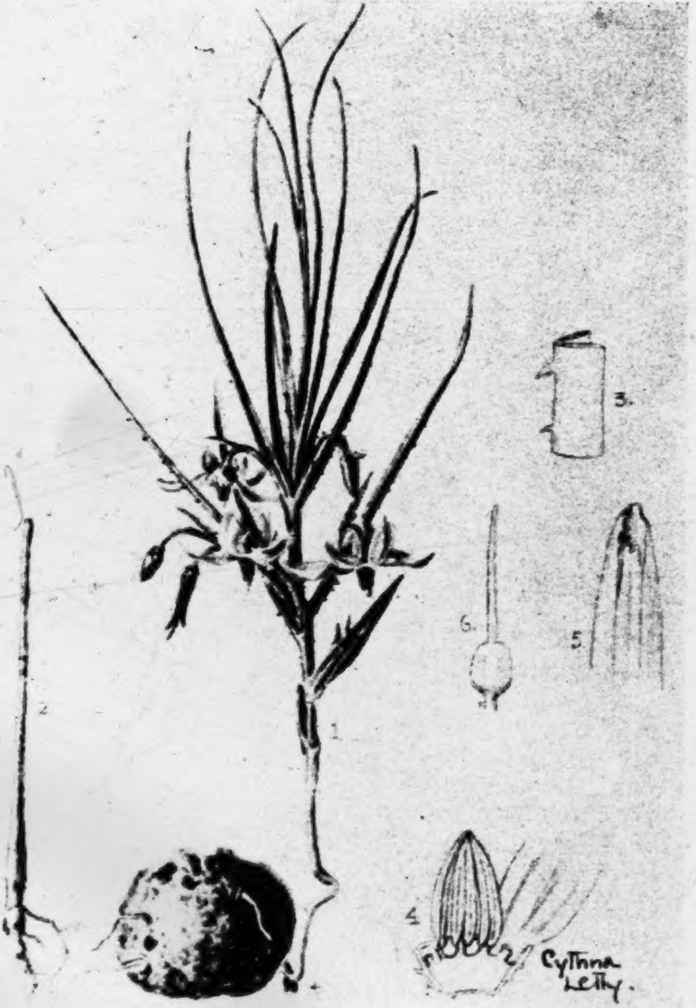
6. *Scilla* sp. (5181) [*Photo: King.*

137x



7. *Sansevieria scabrifolia.* [*Photo: Reyburn.*

137X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3.
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5.
6.
Cythna Letty.

8. *Walleria* sp. [*Photo: King.*

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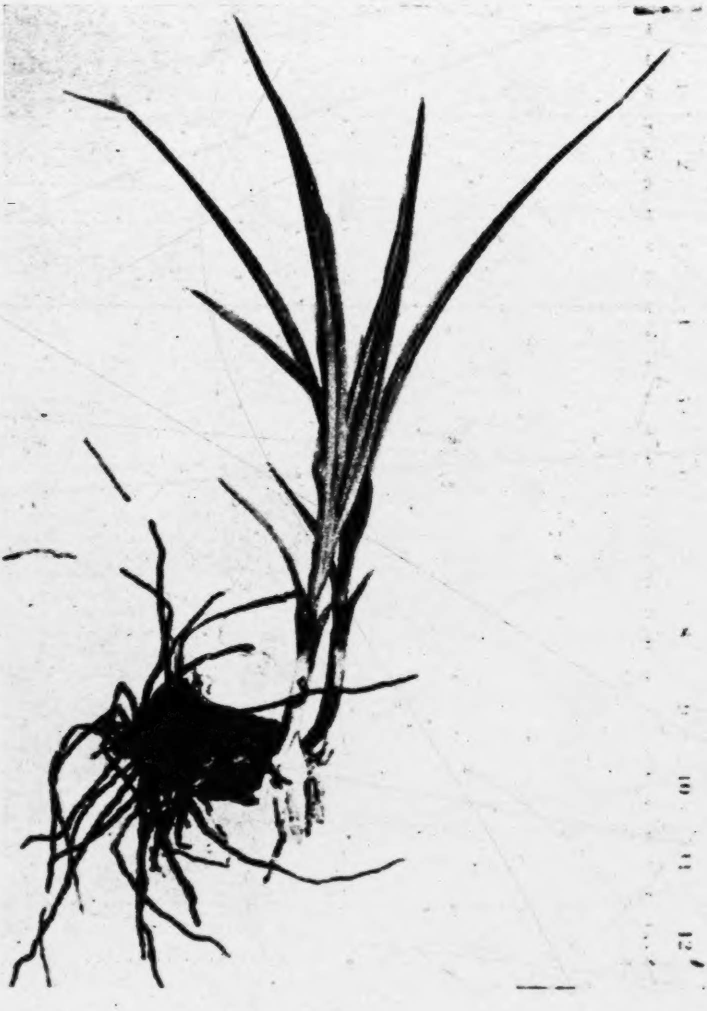

9. *Eulophia* sp. nearest *E. pillansii*. [*Photo: Reyburn.*

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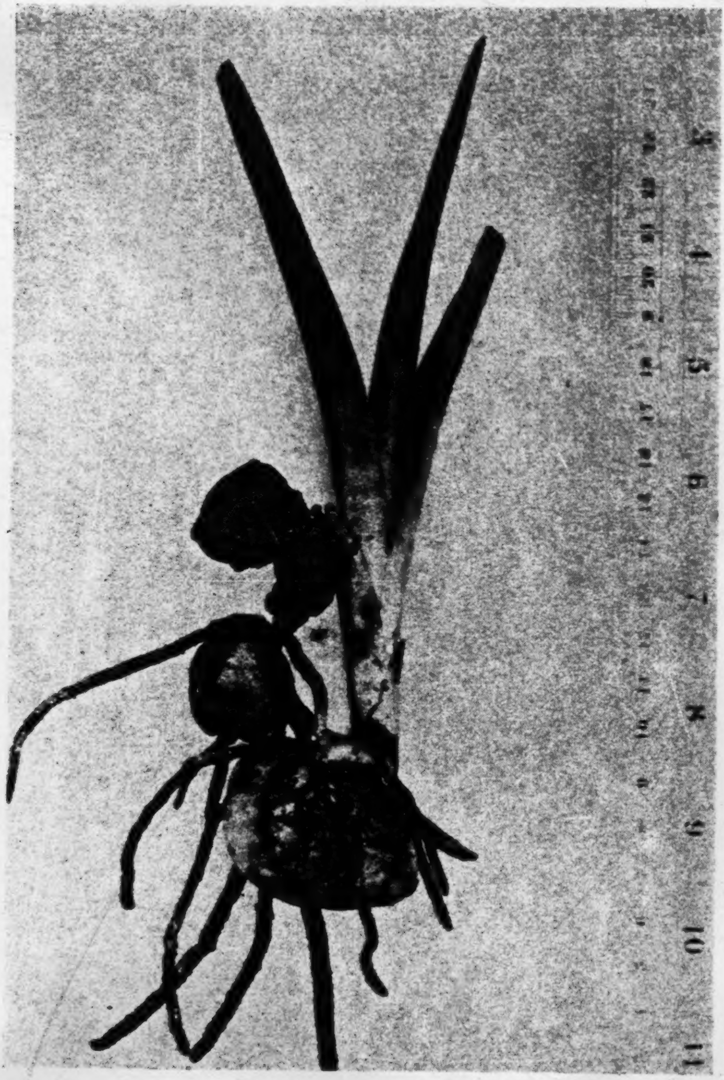
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10. *Eulophia* sp. No. 5213. [*Photo: Reyburn.*

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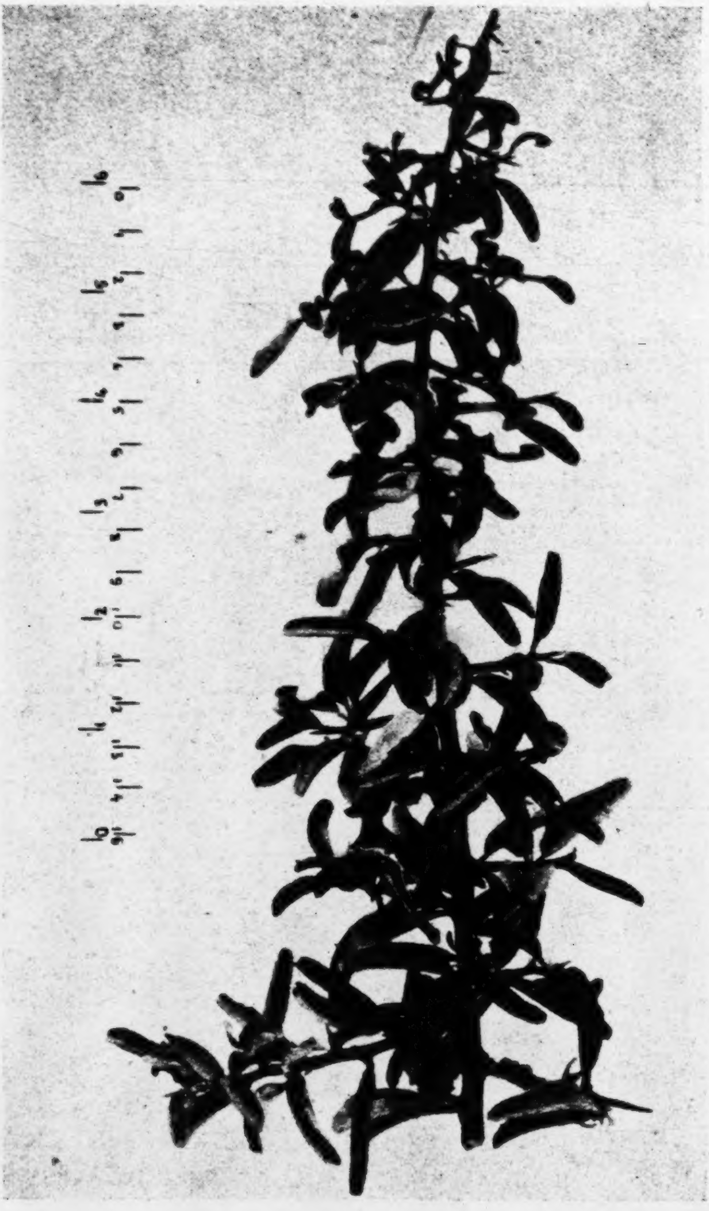

11. *Ximenia americana* var. *microphylla.* [*Photo: Reyburn.*

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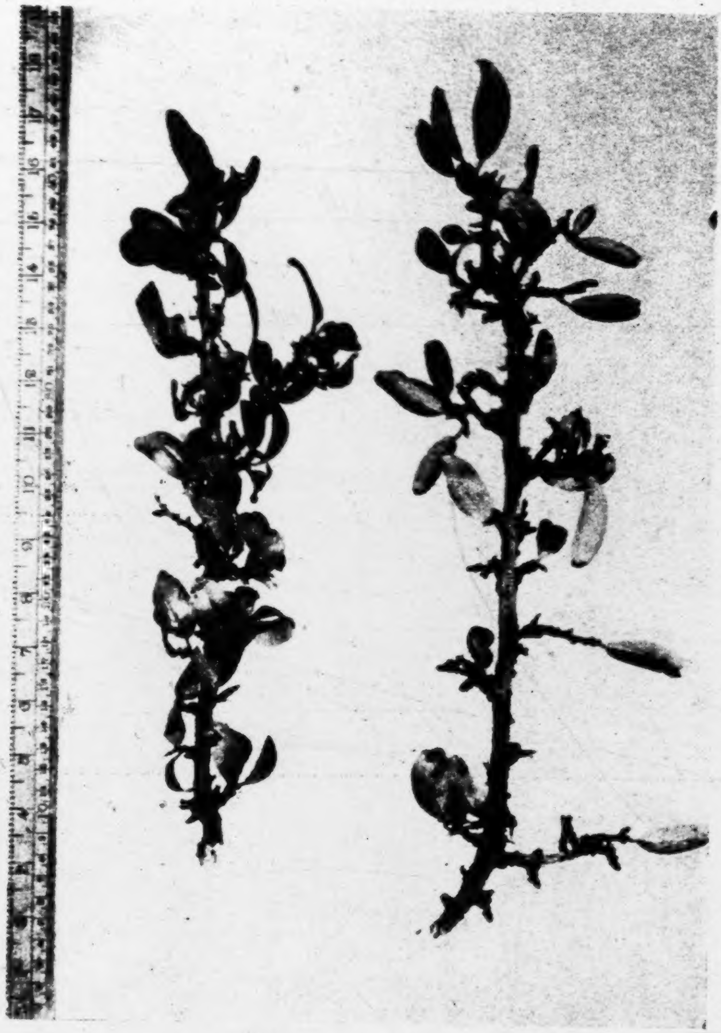

12. *Ximenia caffra.*

[*Photo: Reyburn.*

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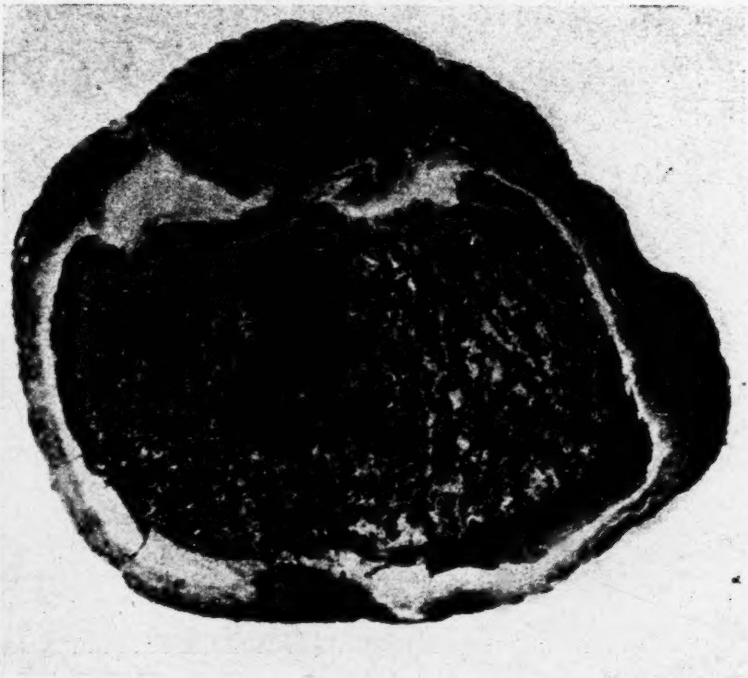

13. *Hydnora* sp. — Natural size. [*Photo: King.*

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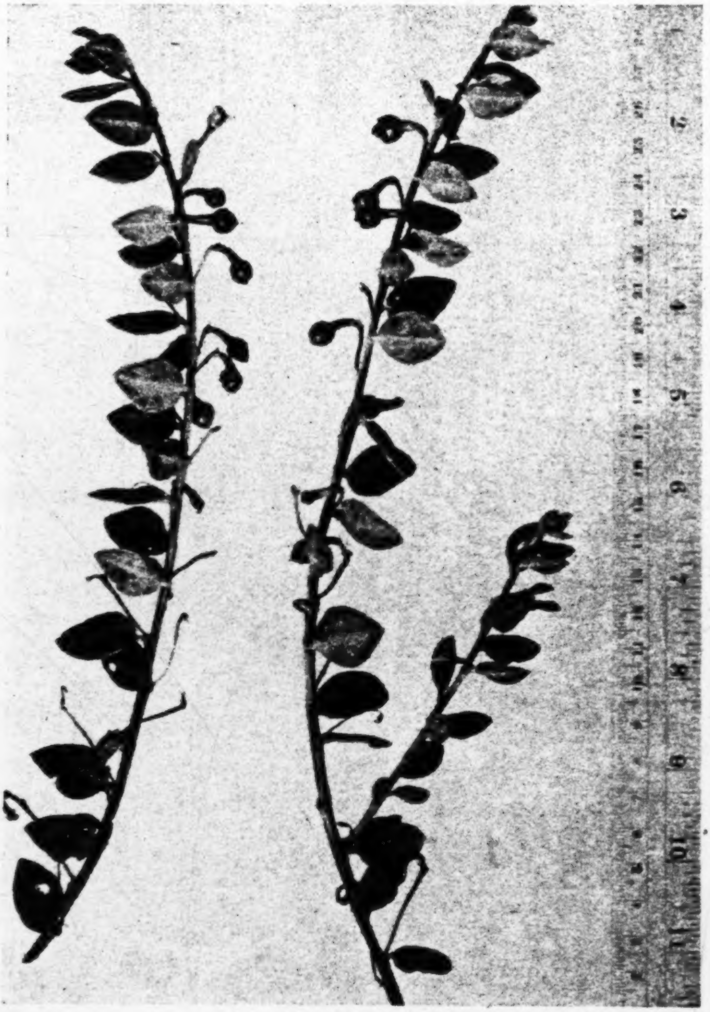

14. *Talinum arnotii.* [*Photo: King.*

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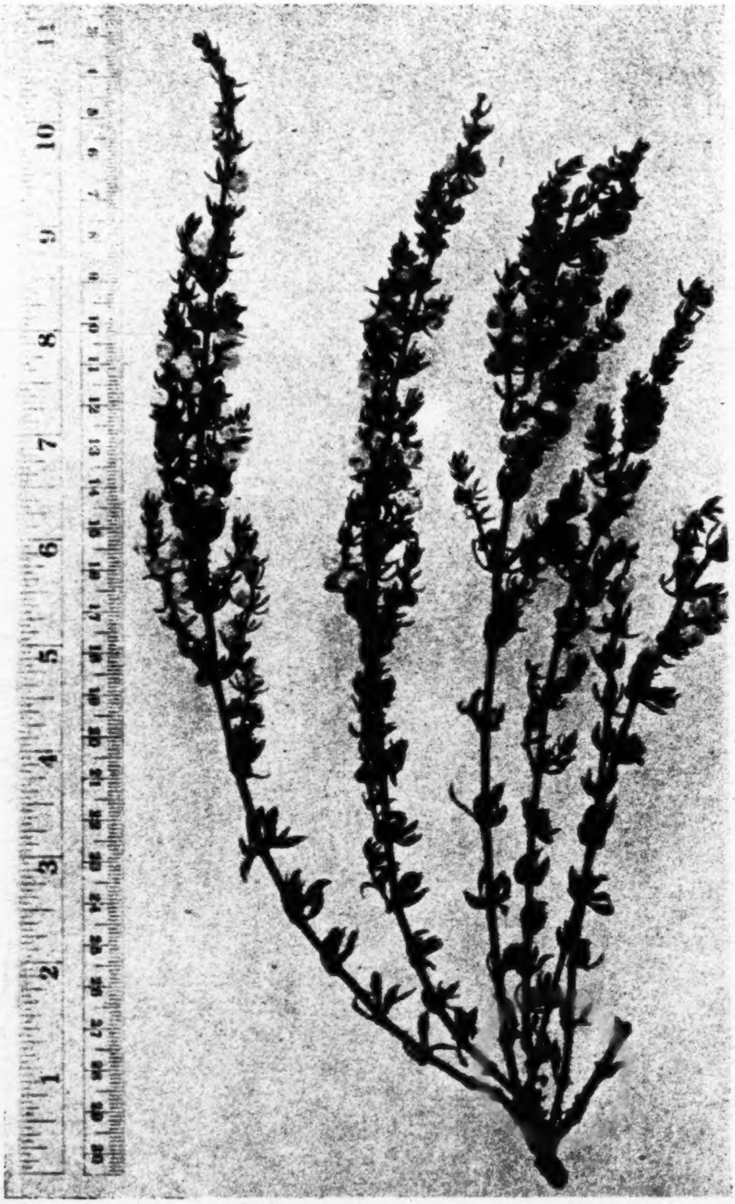

15. *Pollichia campestris.* [*Photo: King.*

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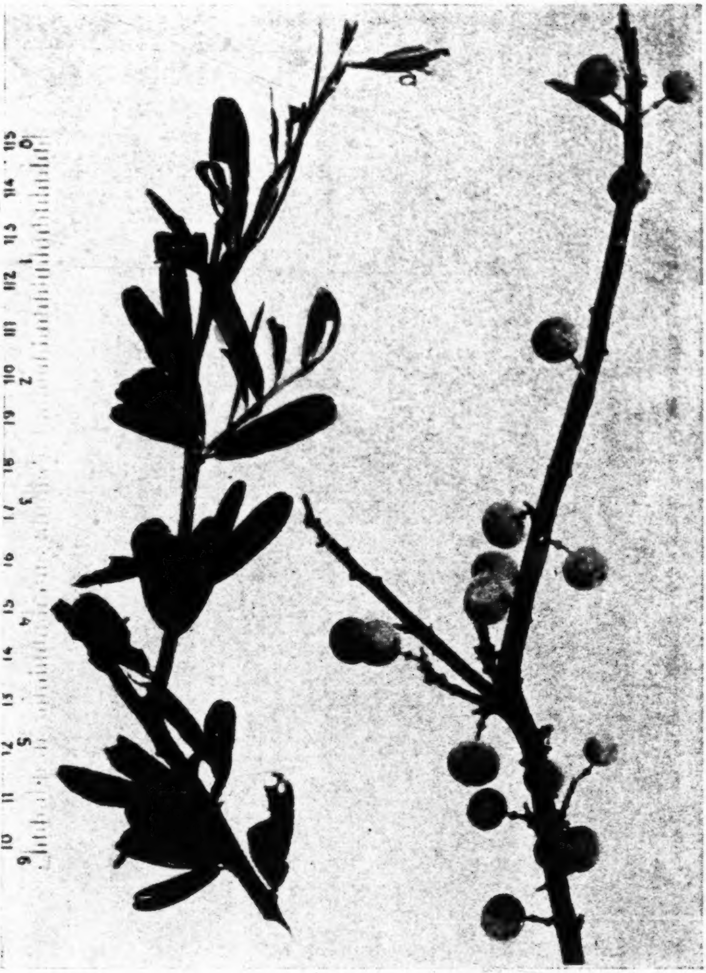
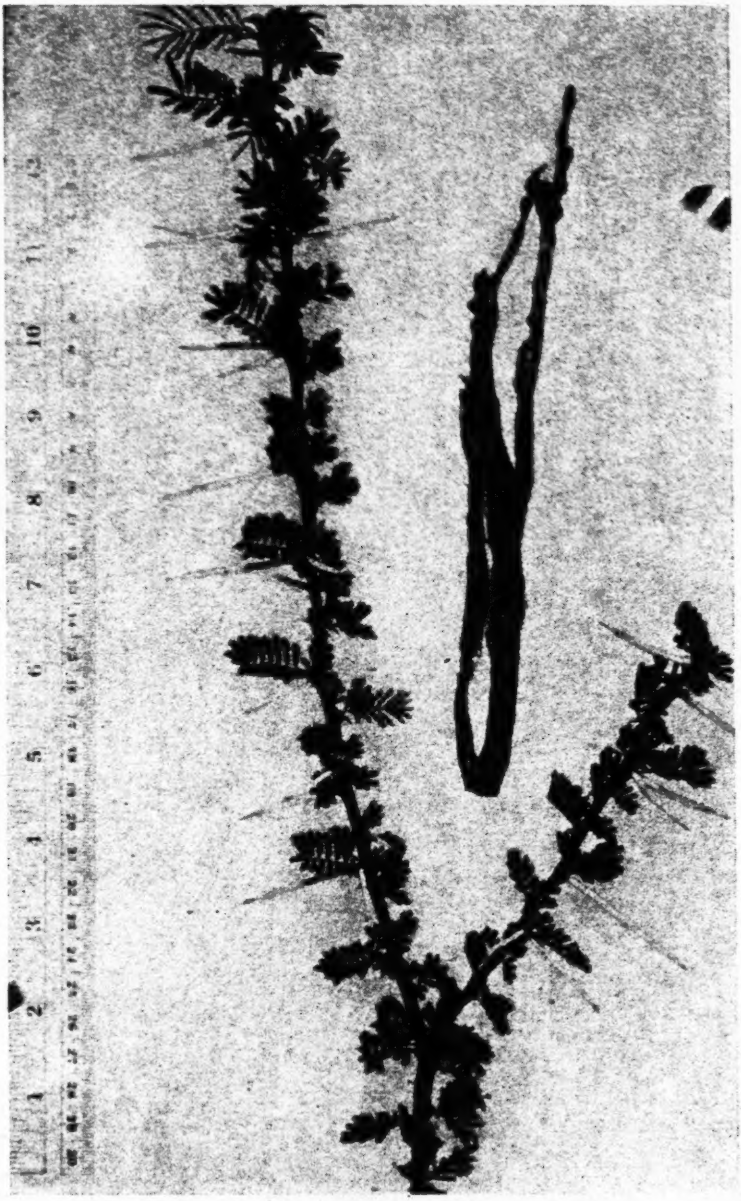


16. *Boscia albitrunca.* [*Photo: Reyburn.*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17. *Acacia heteracantha.* [*Photo: King.*

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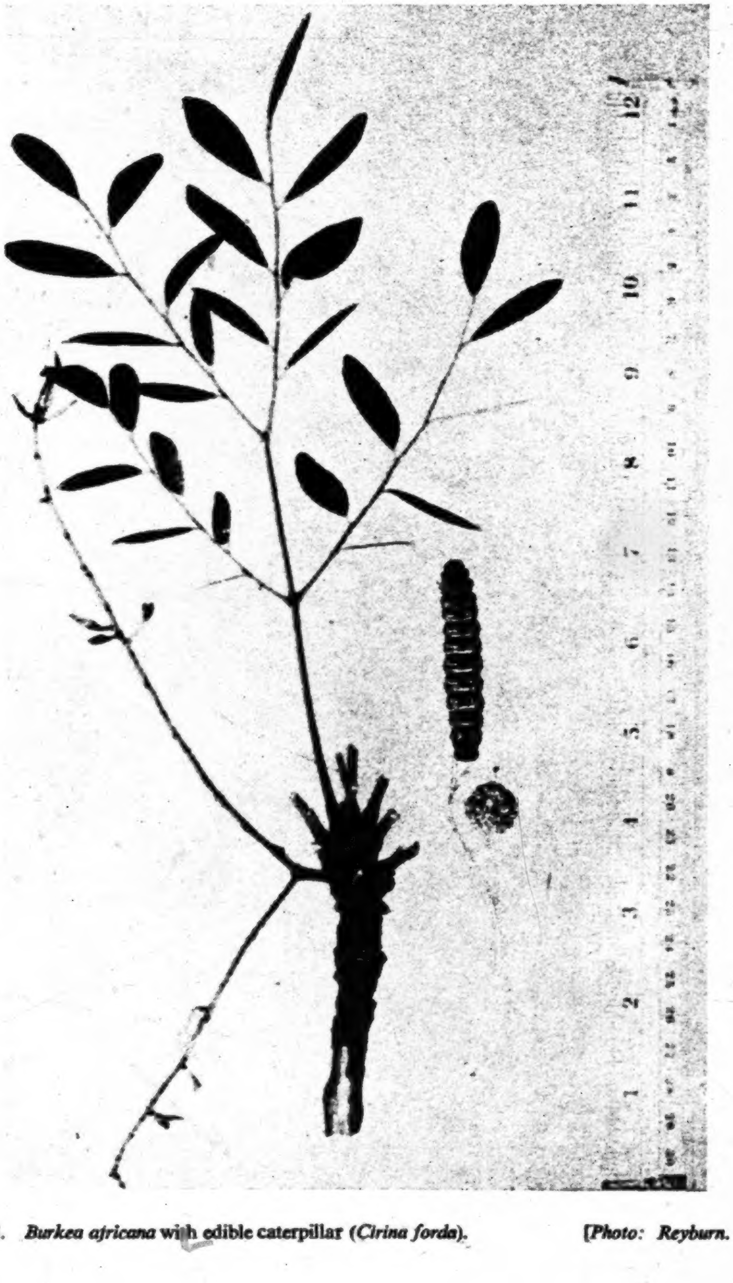
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18. *Burkea africana* with edible caterpillar (*Cirina forda*). [Photo: Reyburn.

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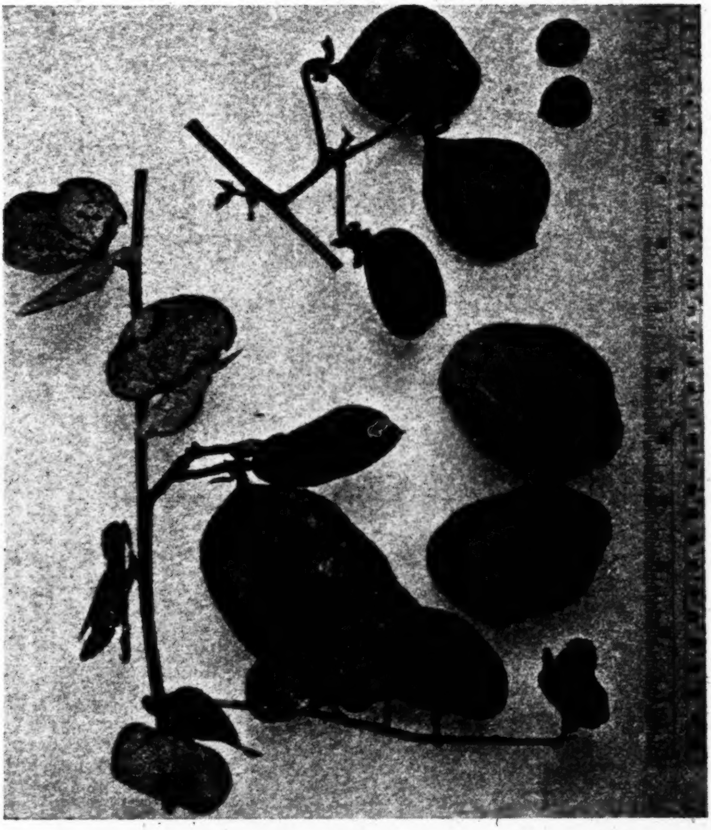

19. *Bauhinia esculenta.* [*Photo: King.*

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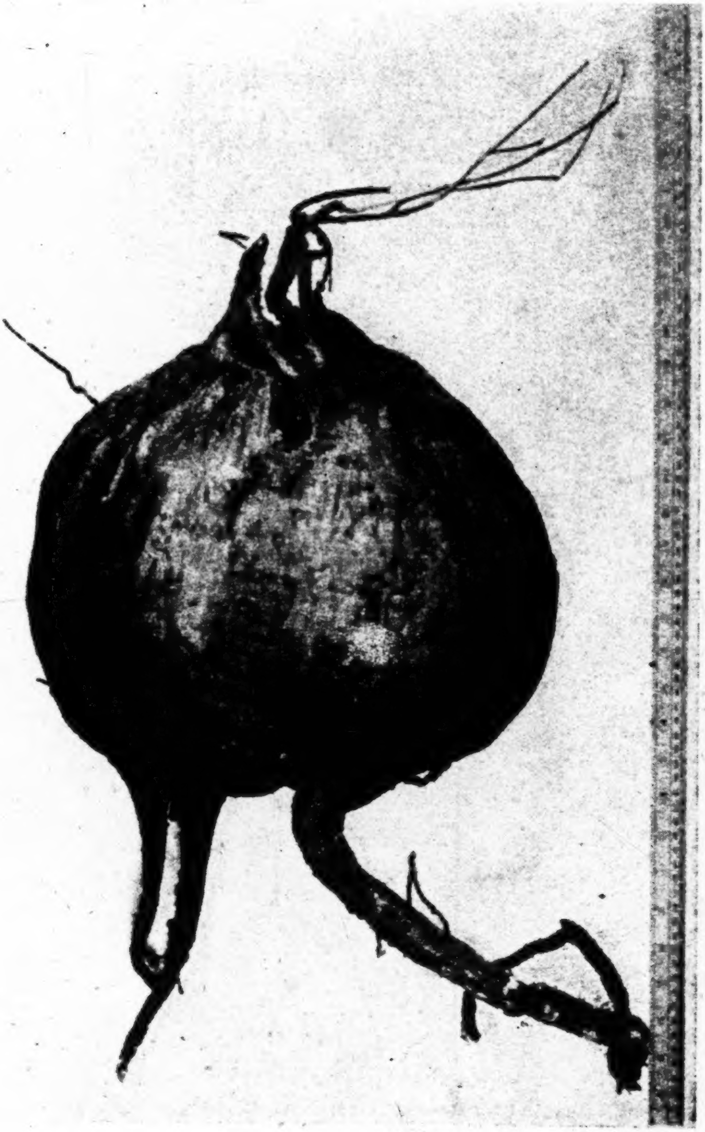

20. *Bauhinia esculenta.* [*Photo: Reyburn.*

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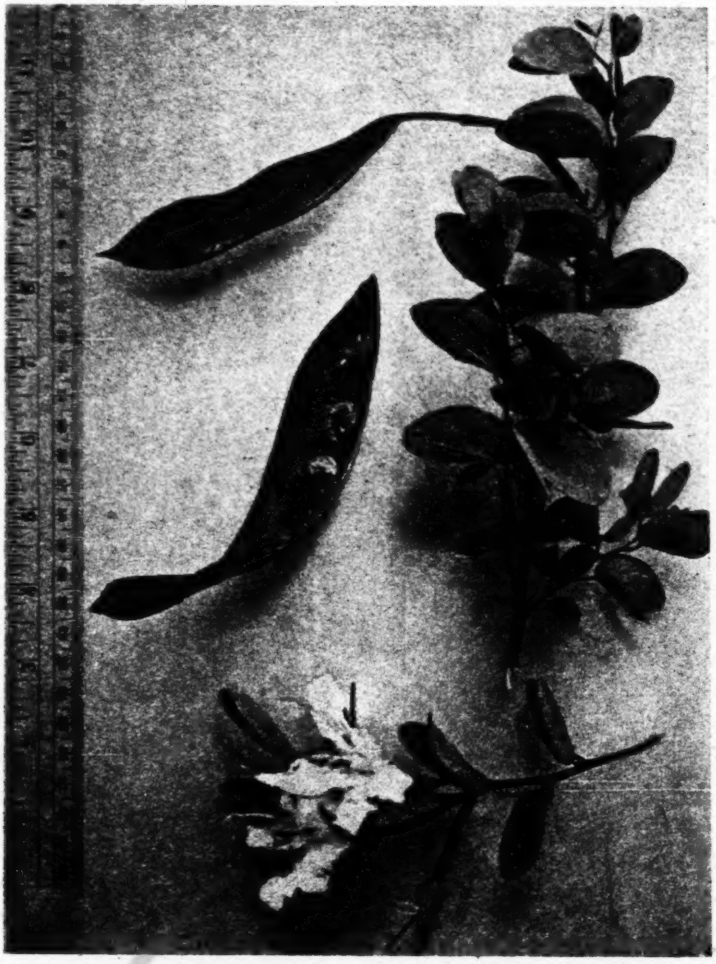

21. *Bauhinia macrantha.* [*Photo: King.*

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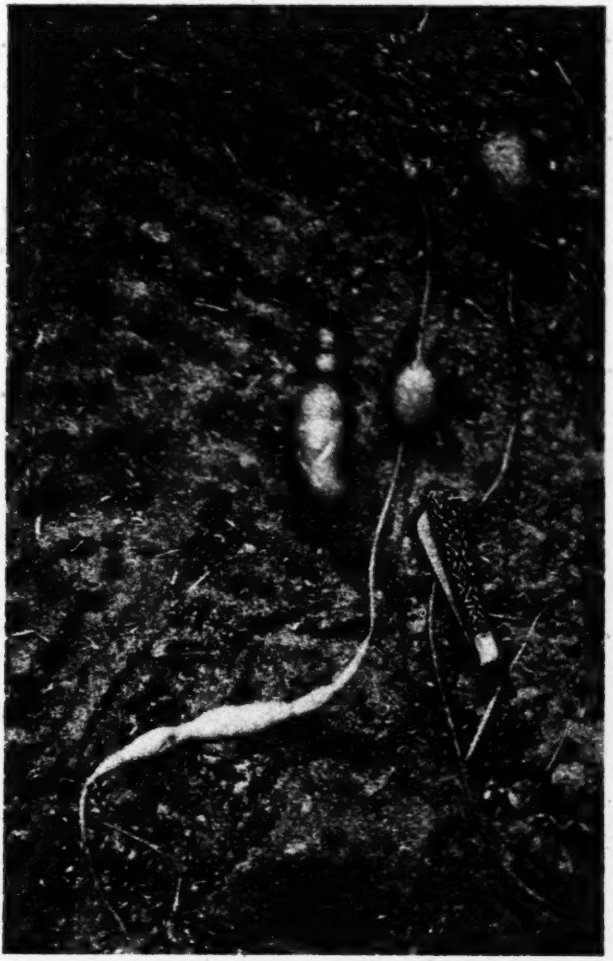

22. *Vigna dinteri.* [*Photo: Story.*

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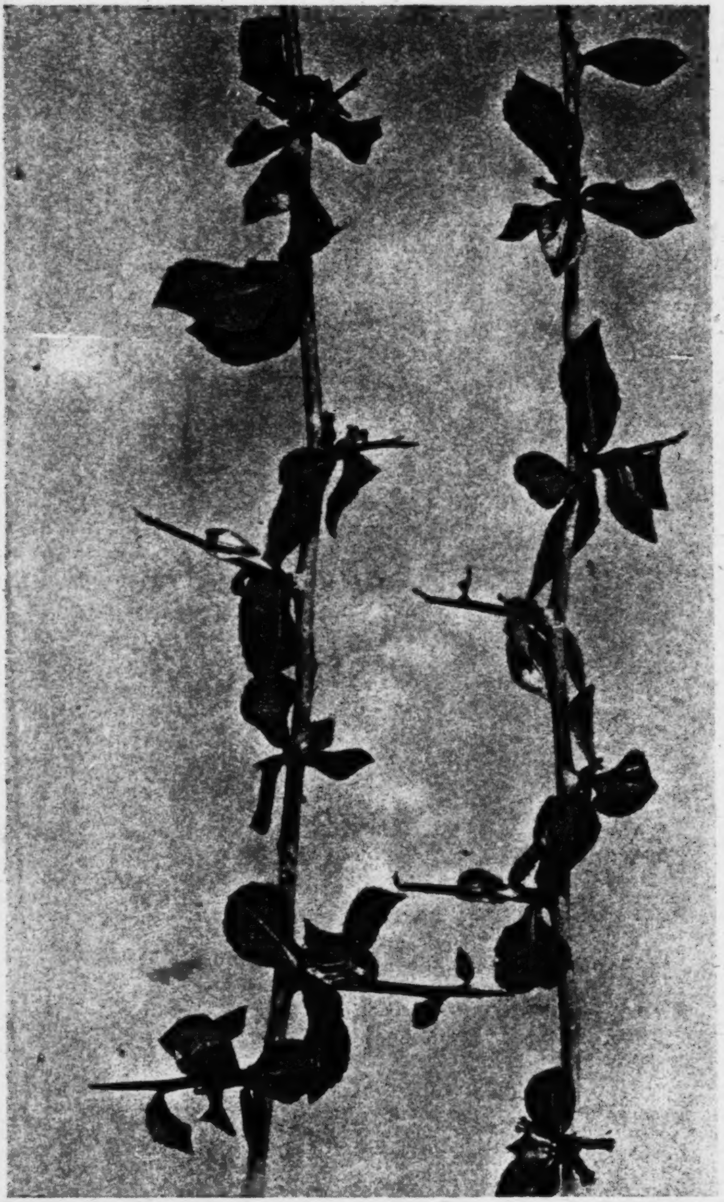
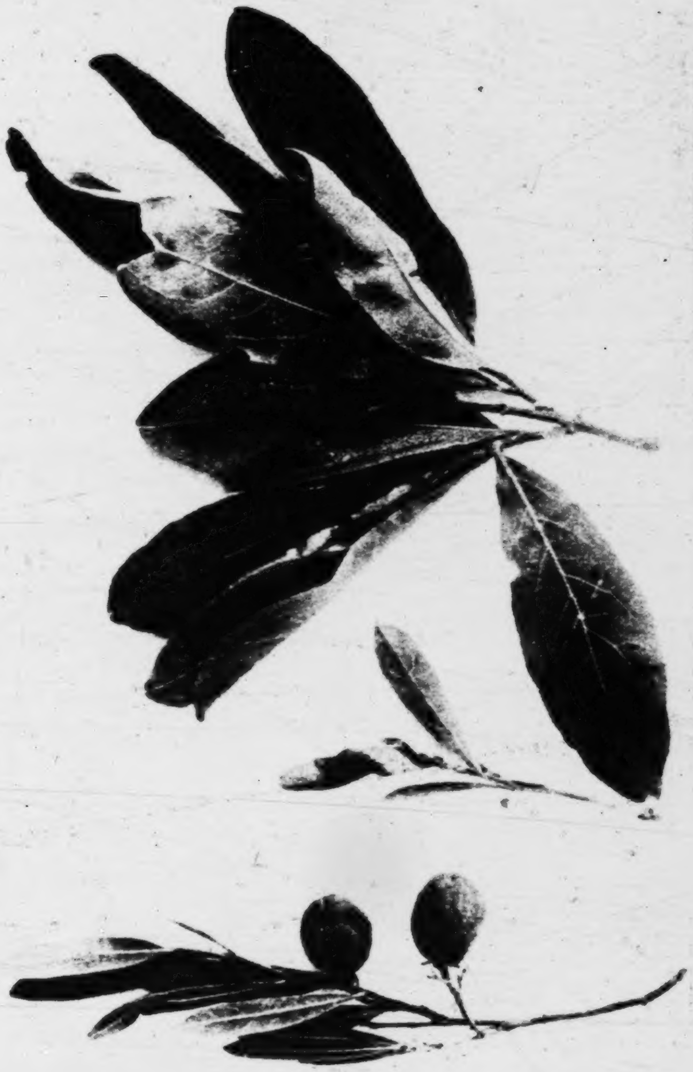
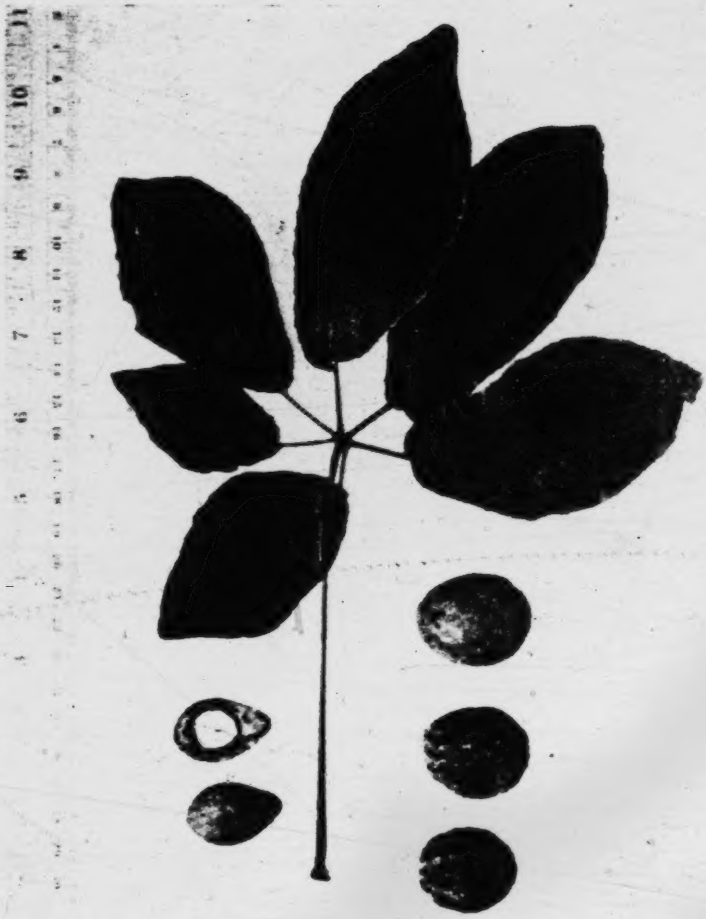


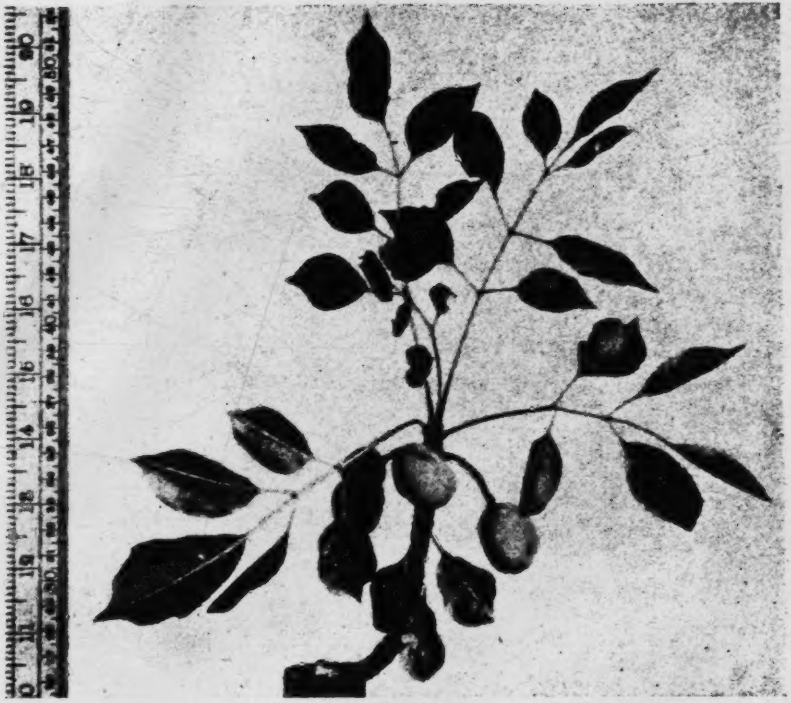
23. *Commiphora pyracanthoides.* [*Photo: Reyburn.*



24. *Dichapetalum cymosum* — Half natural size. [*Photo: King*



25. *Ricinodendron rautanenii.* [*Photo: King.*



6. Sclerocarya caffra. *[Photo: Reyburn.*

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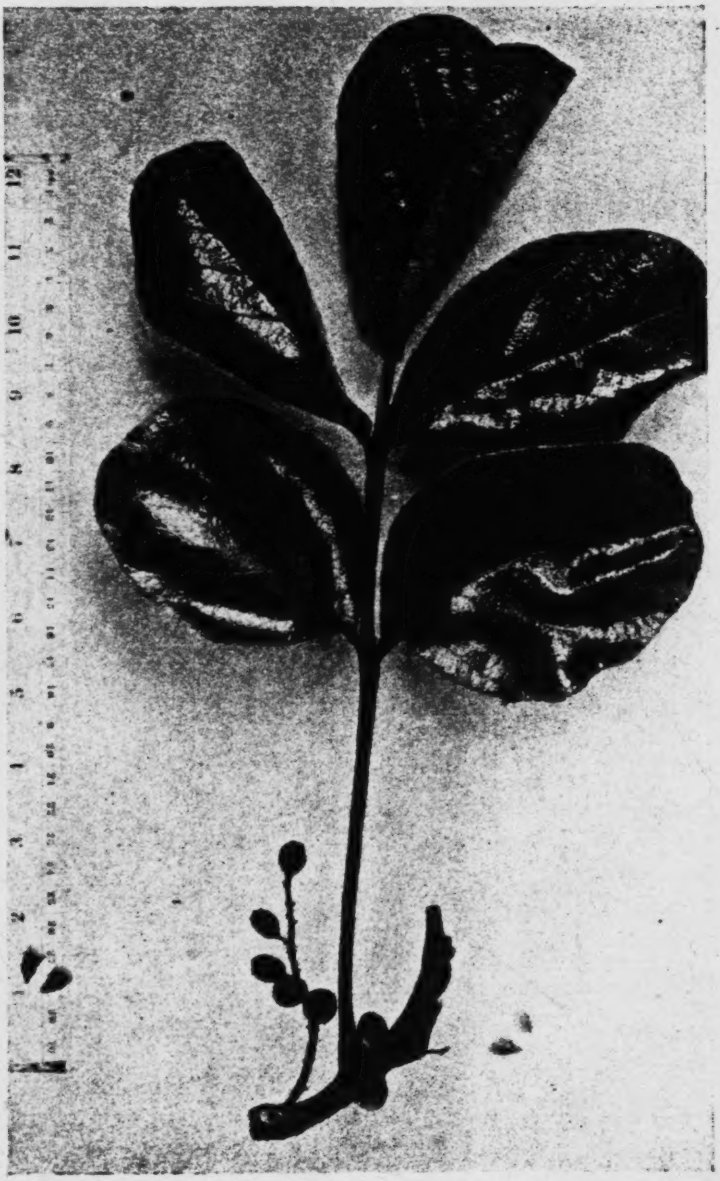

27. *Lannea edulis.* [*Photo: Reyburn.*

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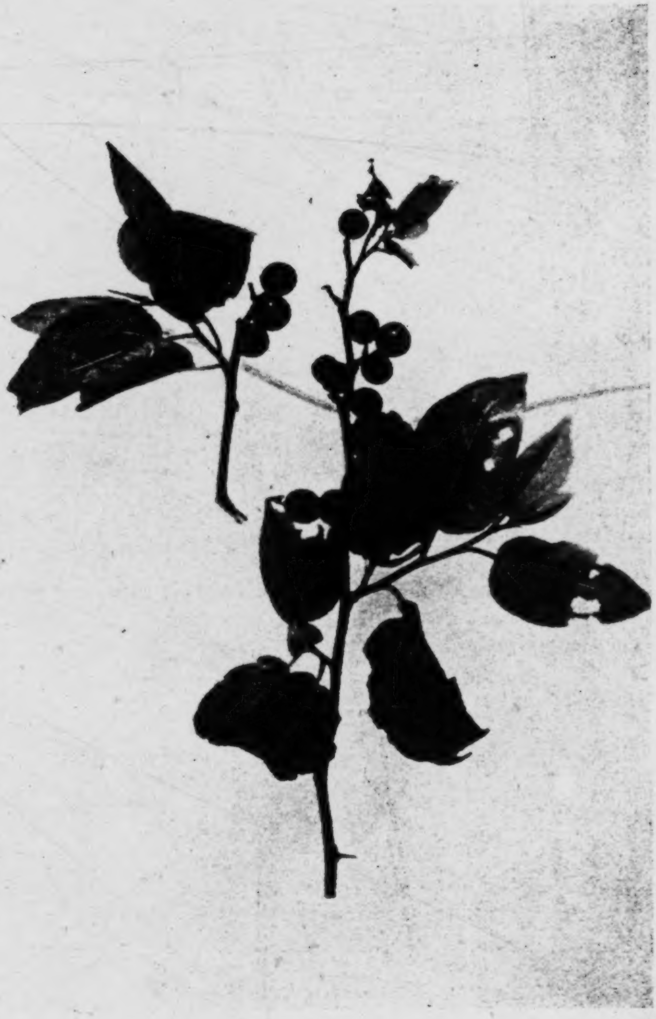

28. *Ziziphus mucronata.* [*Photo: Reyburn.*

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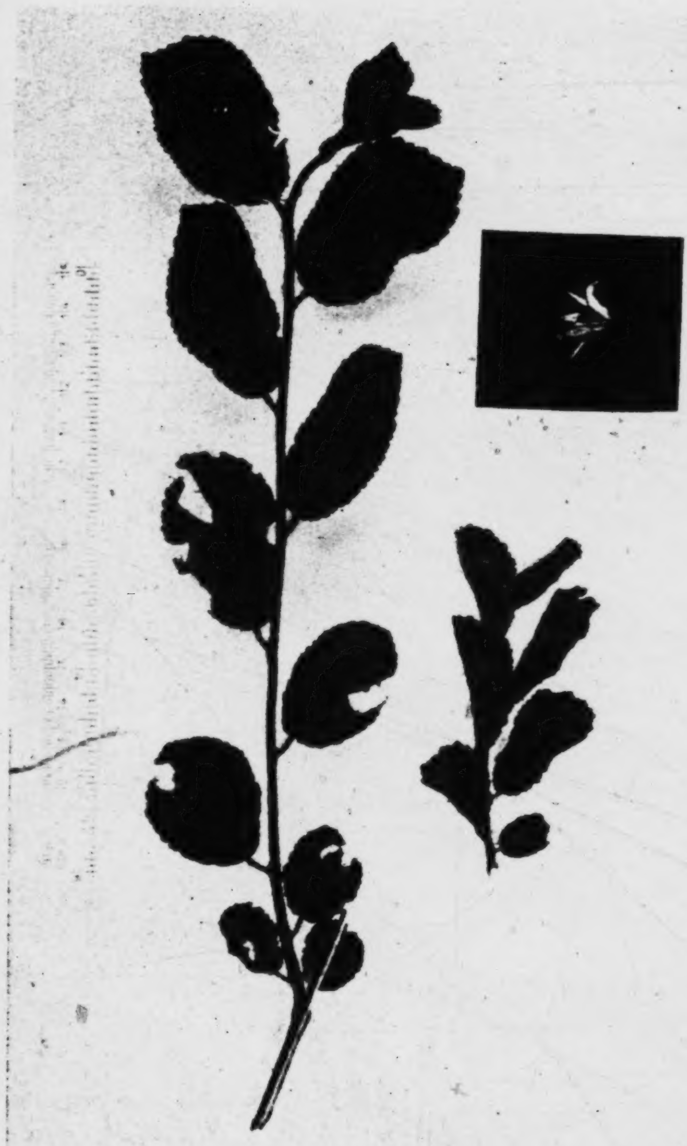

29. *Grewia avellana.* [*Photo: Reyburn.*

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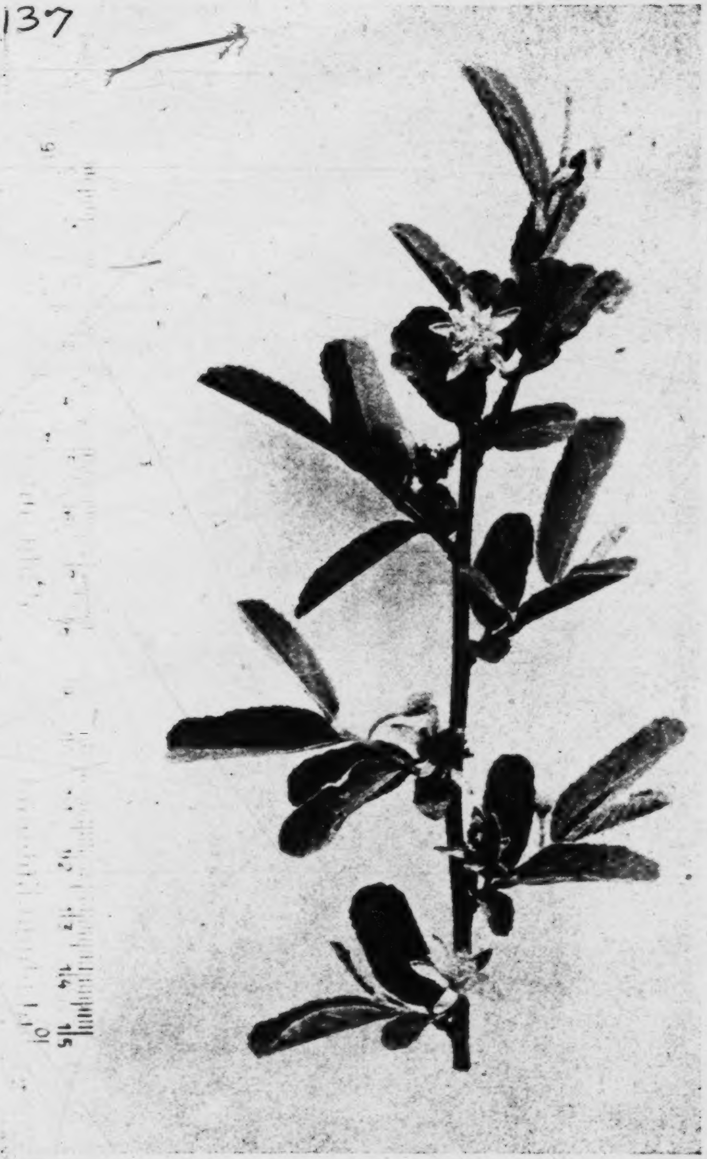

30. *Grewia flava.* [*Photo: Reyburn.*

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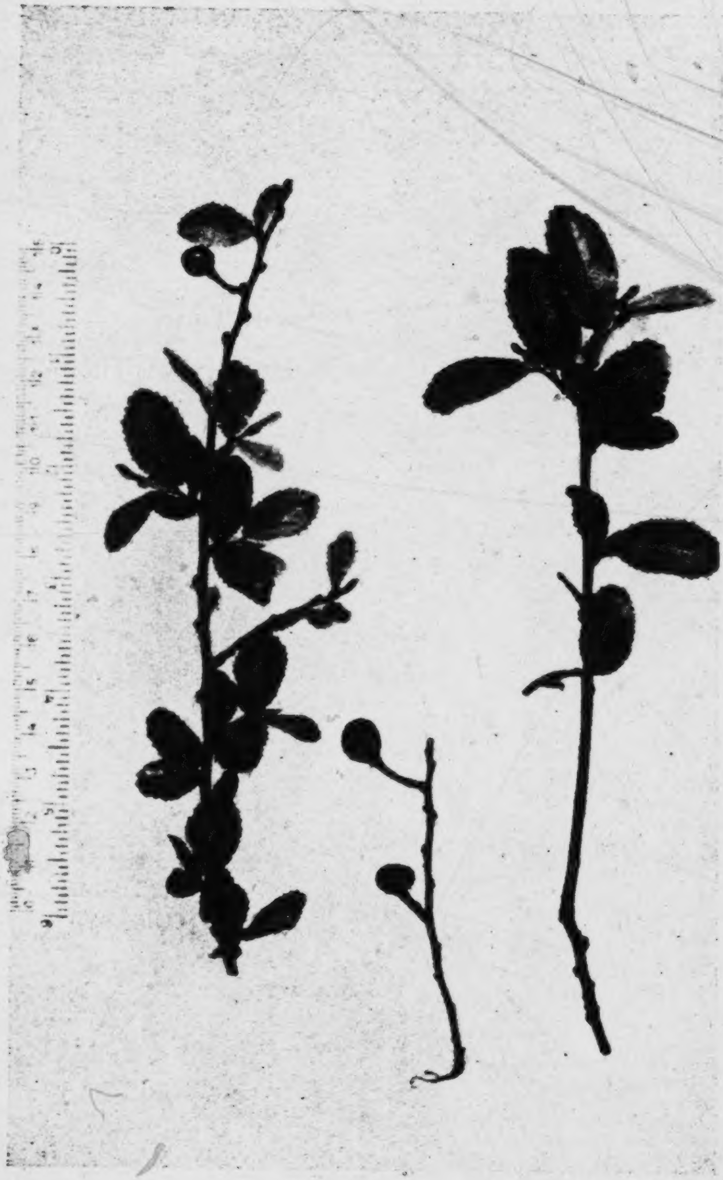

31. *Grewia retinervis.*

[Photo: Reyburn.

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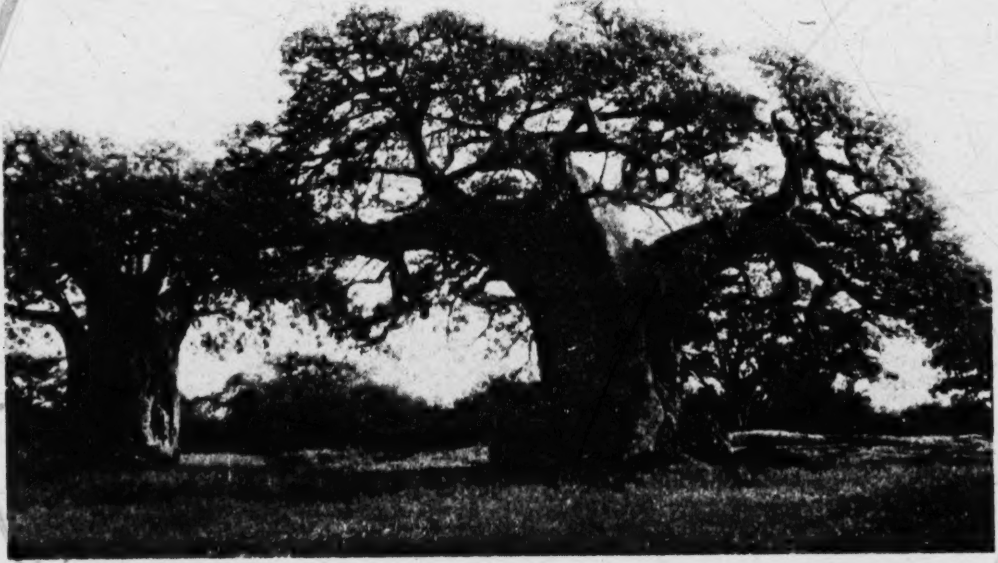
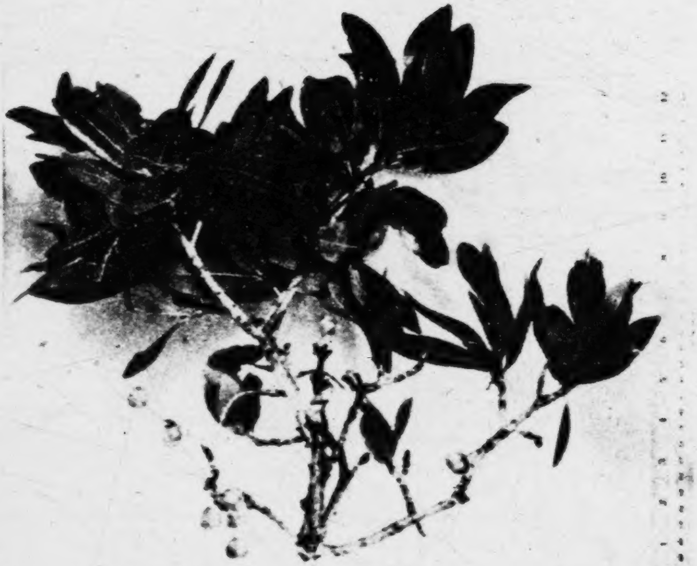


32. *Adansonia digitata.* [*Photo: Dyer.*



33. *Ochna pulchra.* [*Photo: Reyburn.*

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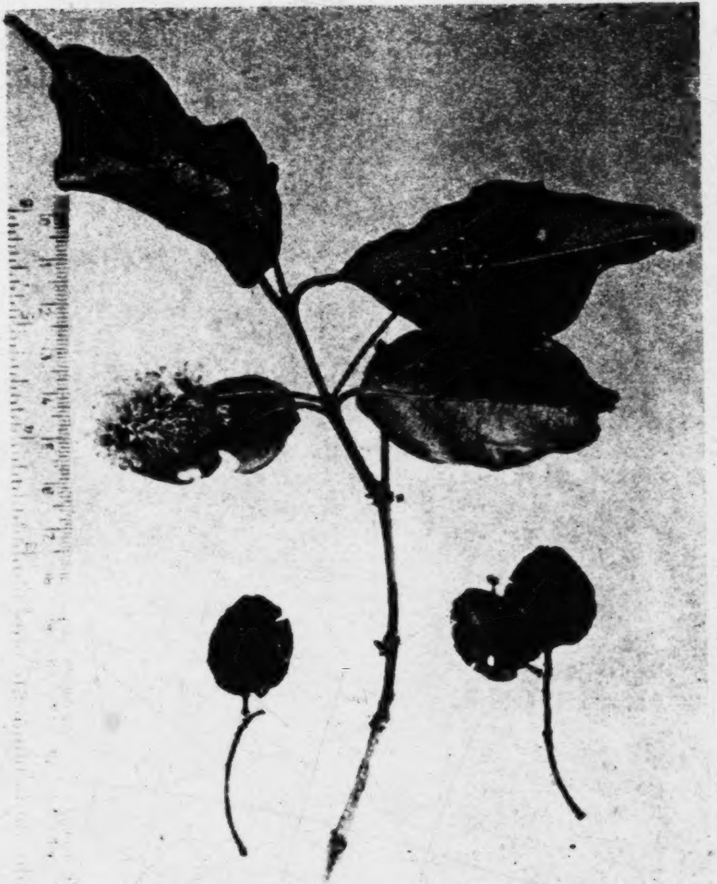

34. *Combretum apiculatum.* [*Photo: Reyburn.*

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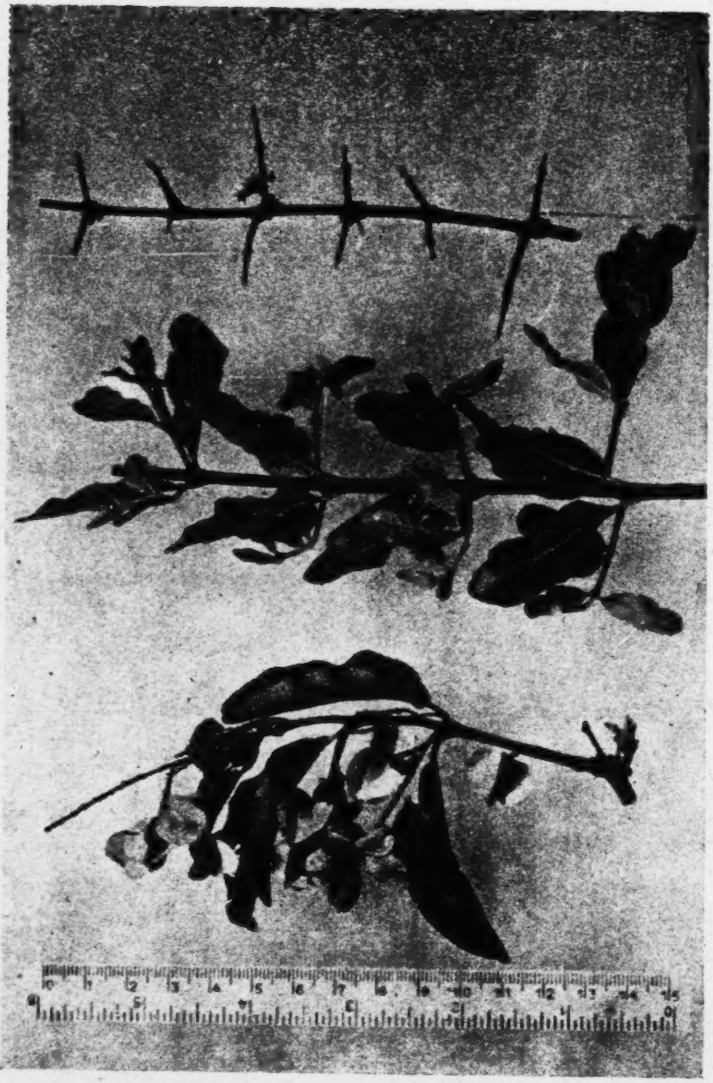
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35. *Combretum imberbe.* [*Photo: Reyburn.*

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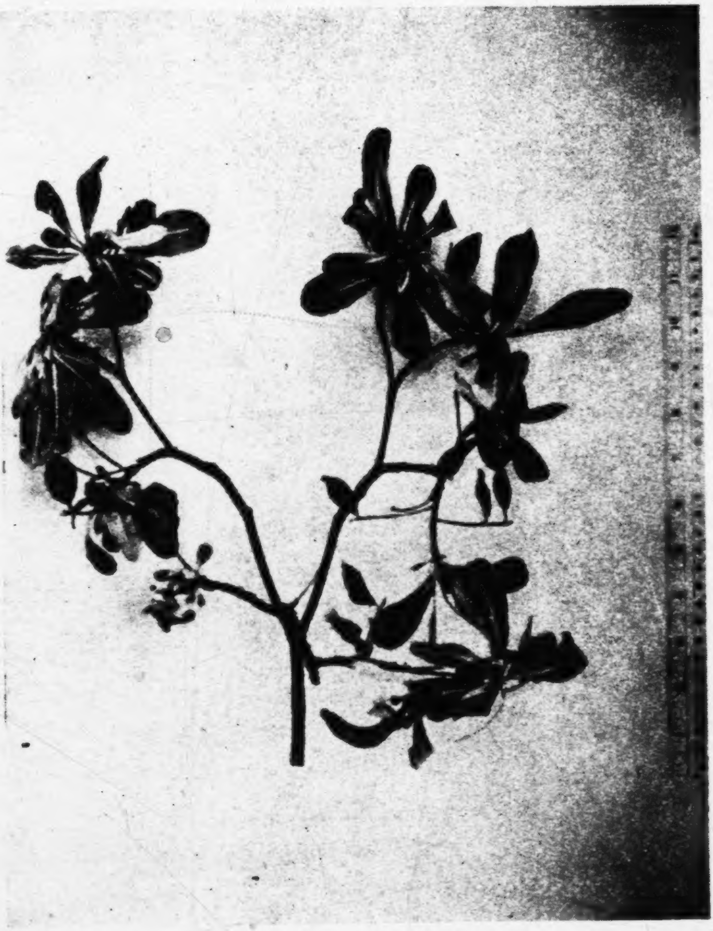

36. *Terminalia sericea.* [*Photo: Reyburn.*

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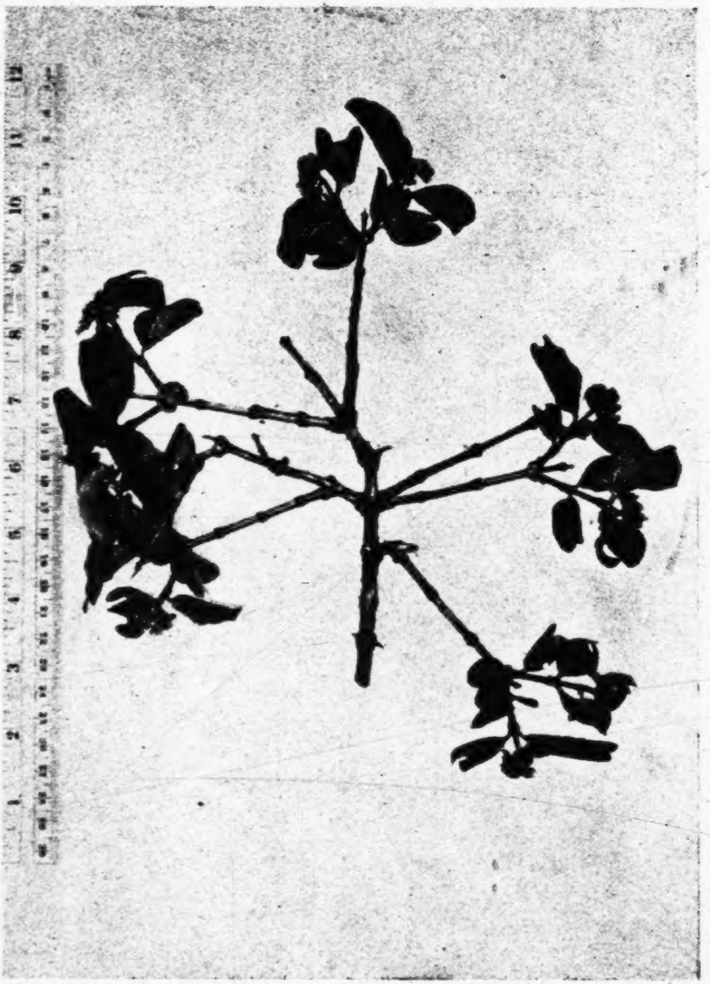
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37. *Strychnos cocculoides.* *[Photo: Reyburn.*

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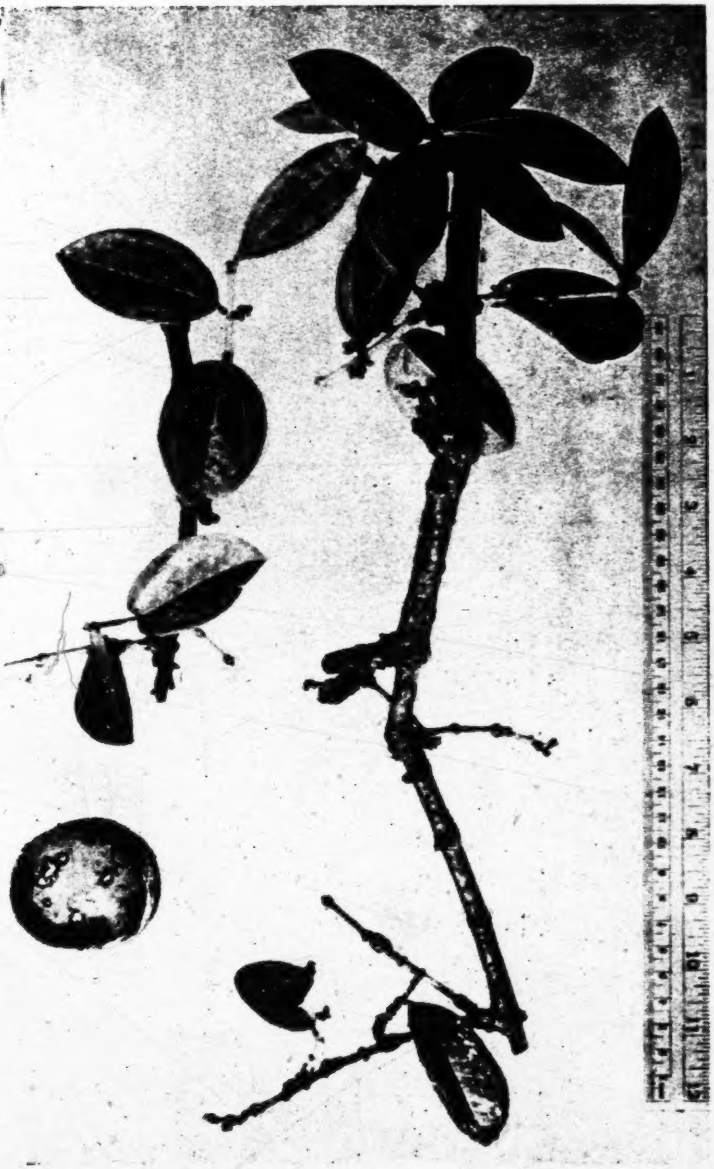

38. *Strychnos pungens.* [*Photo: Reyburn*

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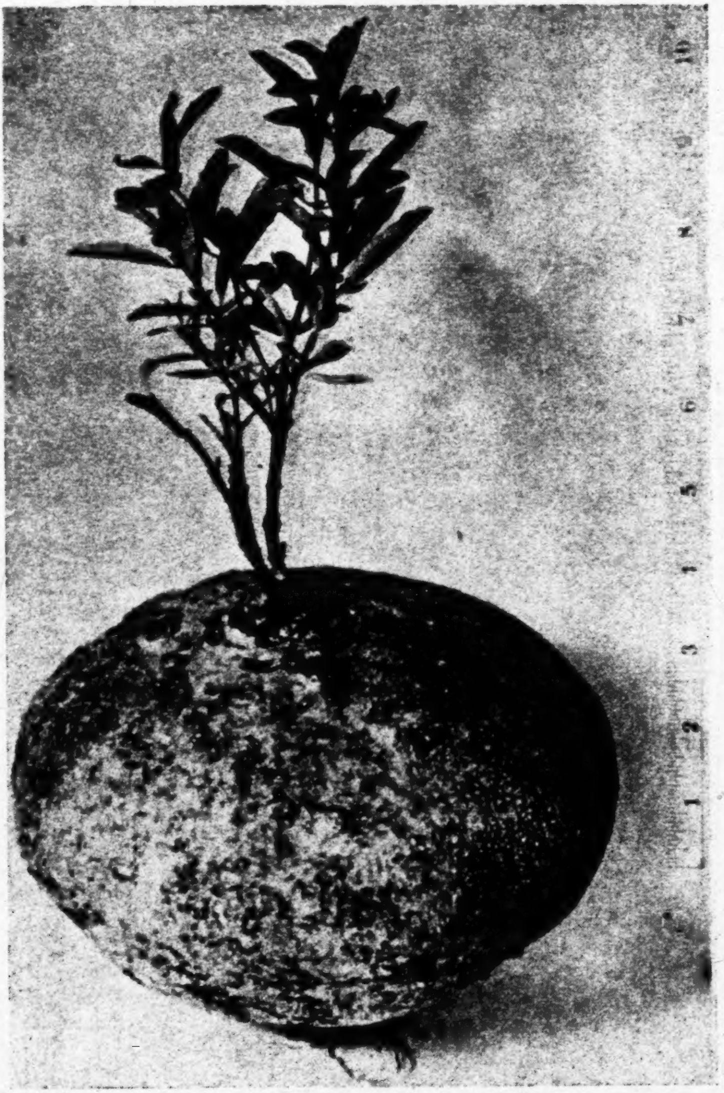

39 *Raphionacme burkei.* [*Photo: King*

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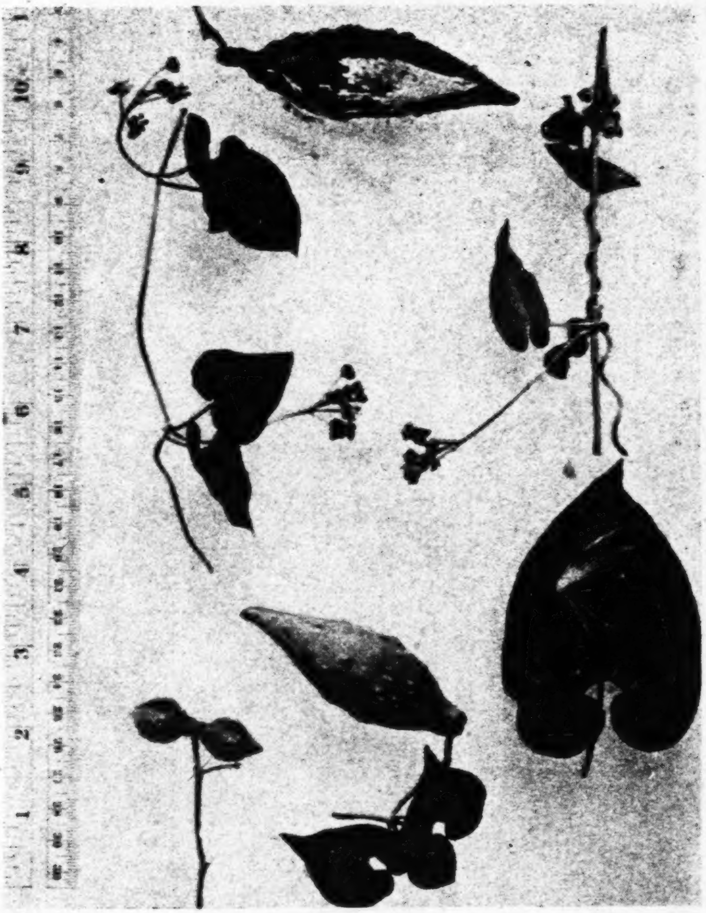

40. *Pentarrhinum insipidum.* [*Photo: King*

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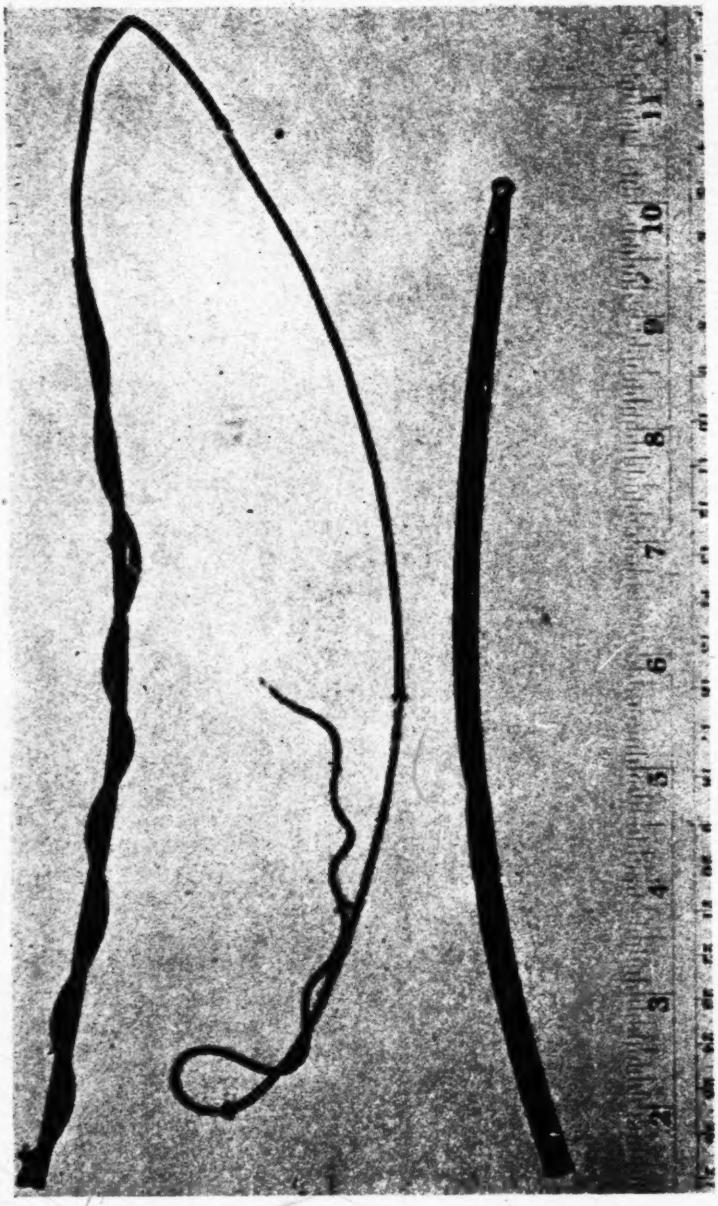
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41. *Sarcostemma viminale.* [*Photo: Reyburn.*

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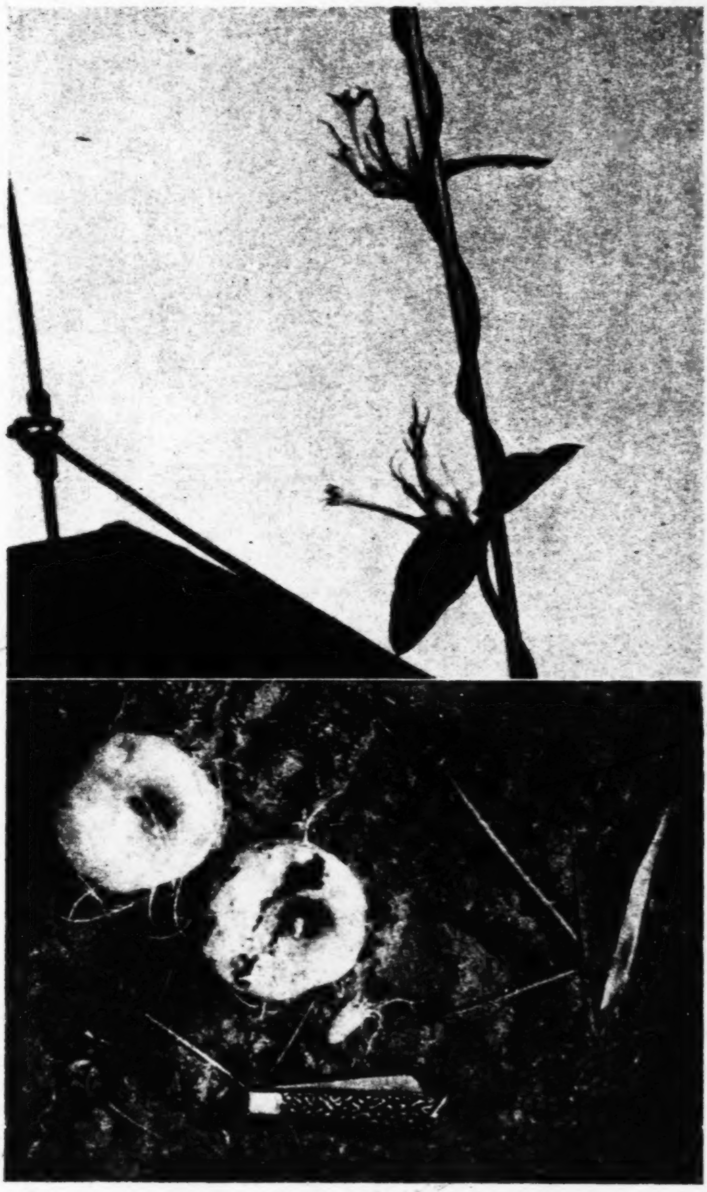

42. *Ceropegia tentaculata* — Flowers natural size. [*Photos: King and Story.*

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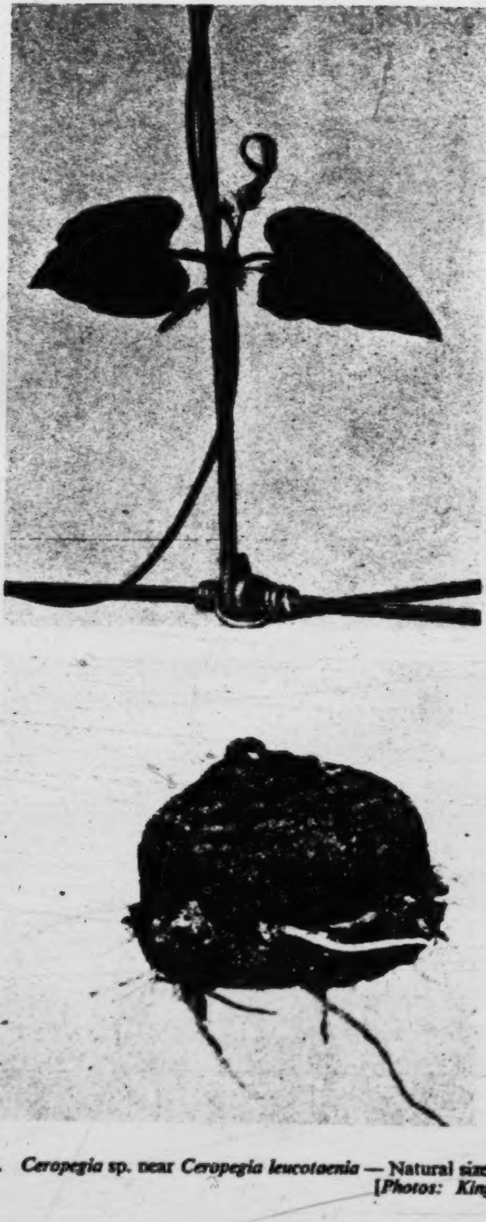

43. *Ceropegia* sp. near *Ceropegia leucotaenia* — Natural size.
[*Photos: King and Reyburn*.

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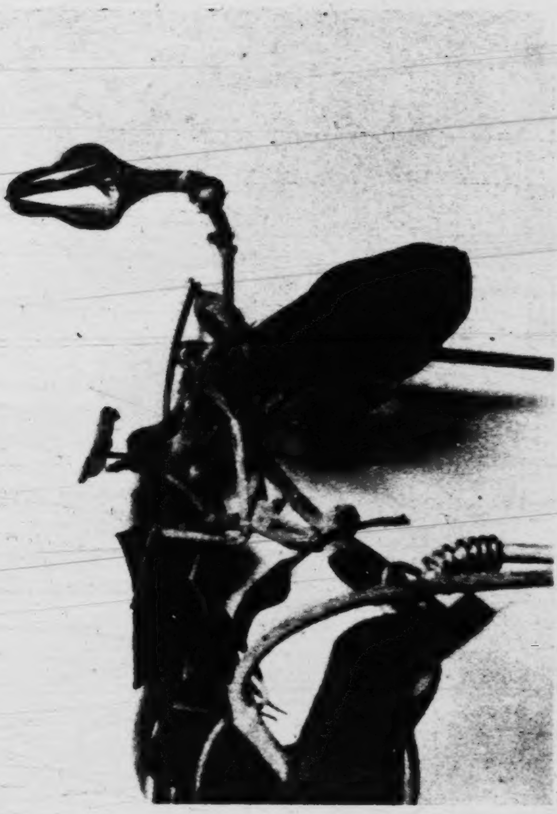

4[illegible]. *Ceropegia* sp. near *Ceropegia lugardae* — Natrual size *Photo: King.*

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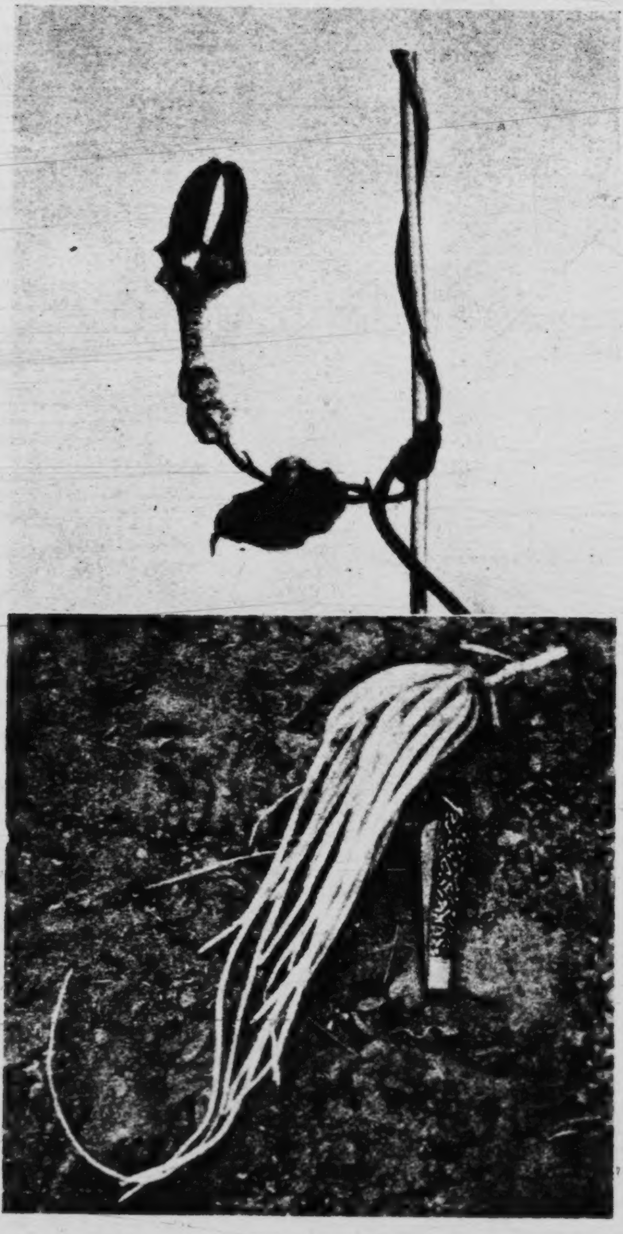

45. *Ceropegia* sp. near *Ceropegia mozambicensis* — Flower natural size.
[*Photos: King and Story.*

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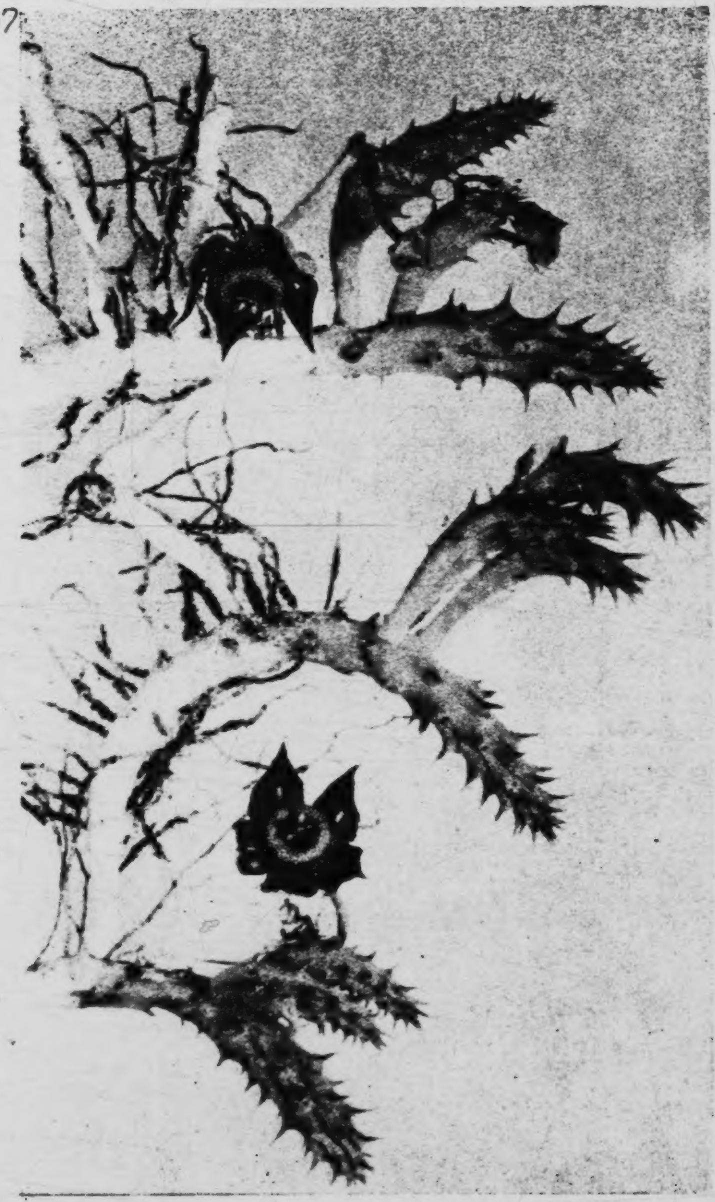

46. *Duvalia polita* — Natural size. [*Photo: King.*

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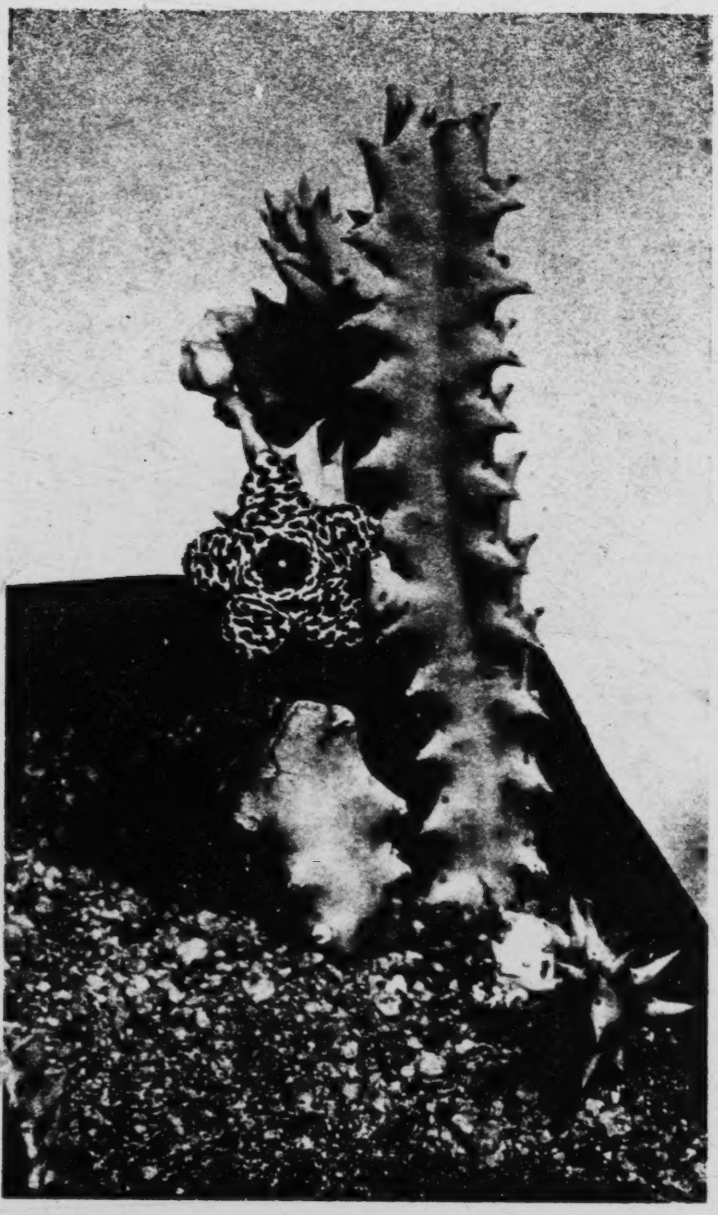

47. *Caralluma knobelii* — Natural size. [*Photo:* *King.*

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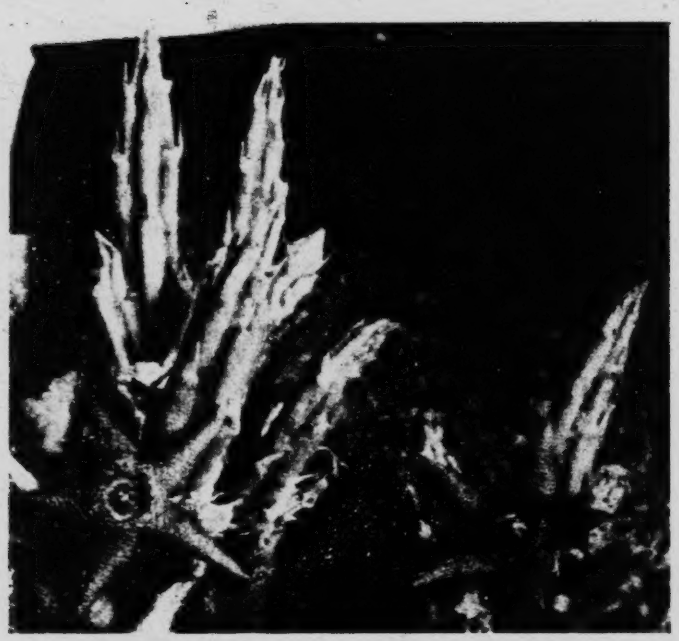

48. *Stapelia kwebensis* — Natural size. [*Photo: King.*

49. *Ipomoea verbascoidea.* [*Photo: Story.*

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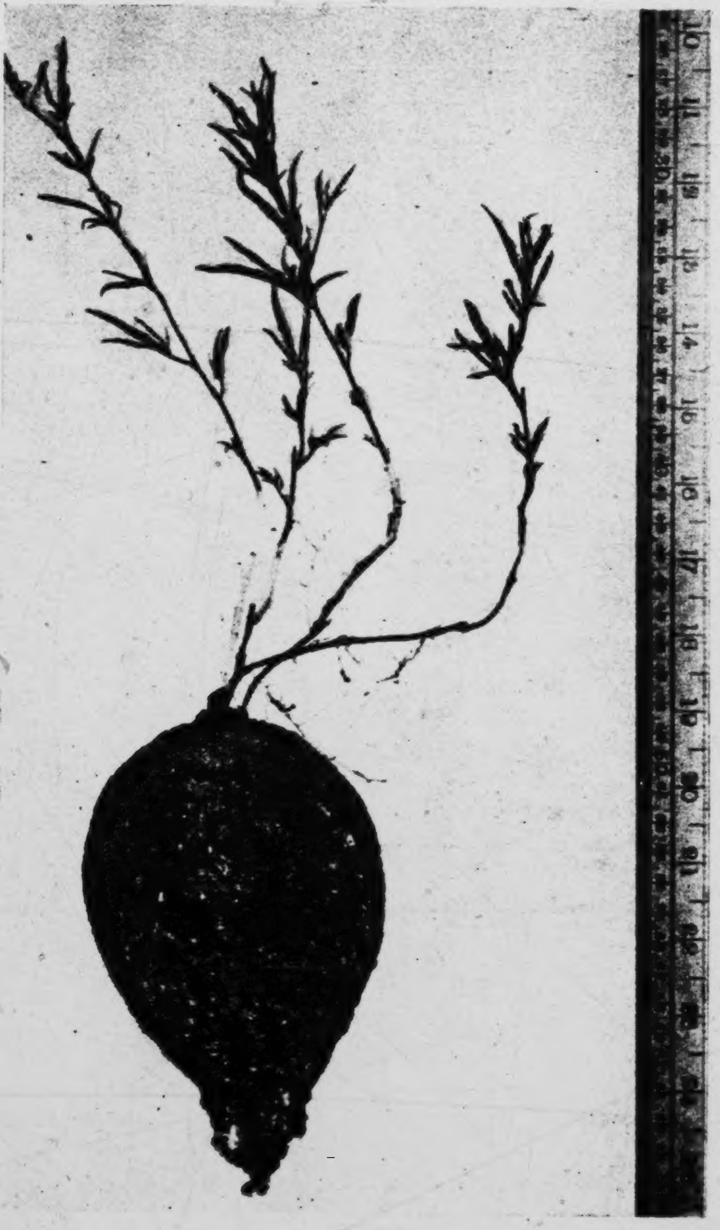
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50. *Ipomoea* sp.

[*Photo: Reyburn.*

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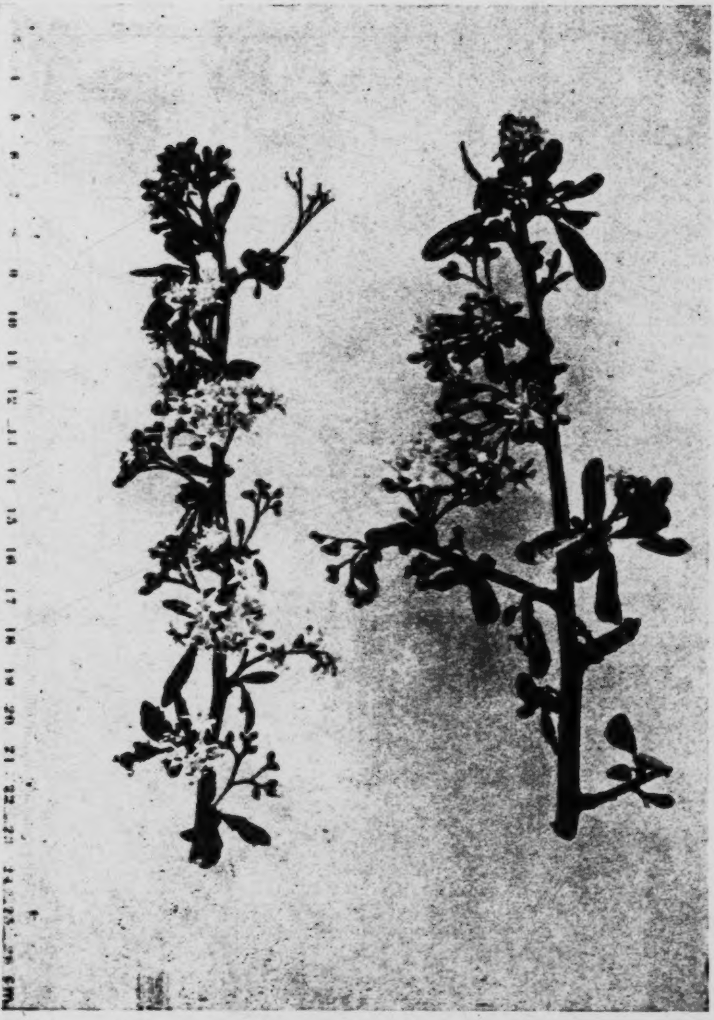

51. *Ehretia rigida.* [*Photo: Reyburn.*

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52. *Catophractes alexandri.* [*Photo:* *Reyburn.*

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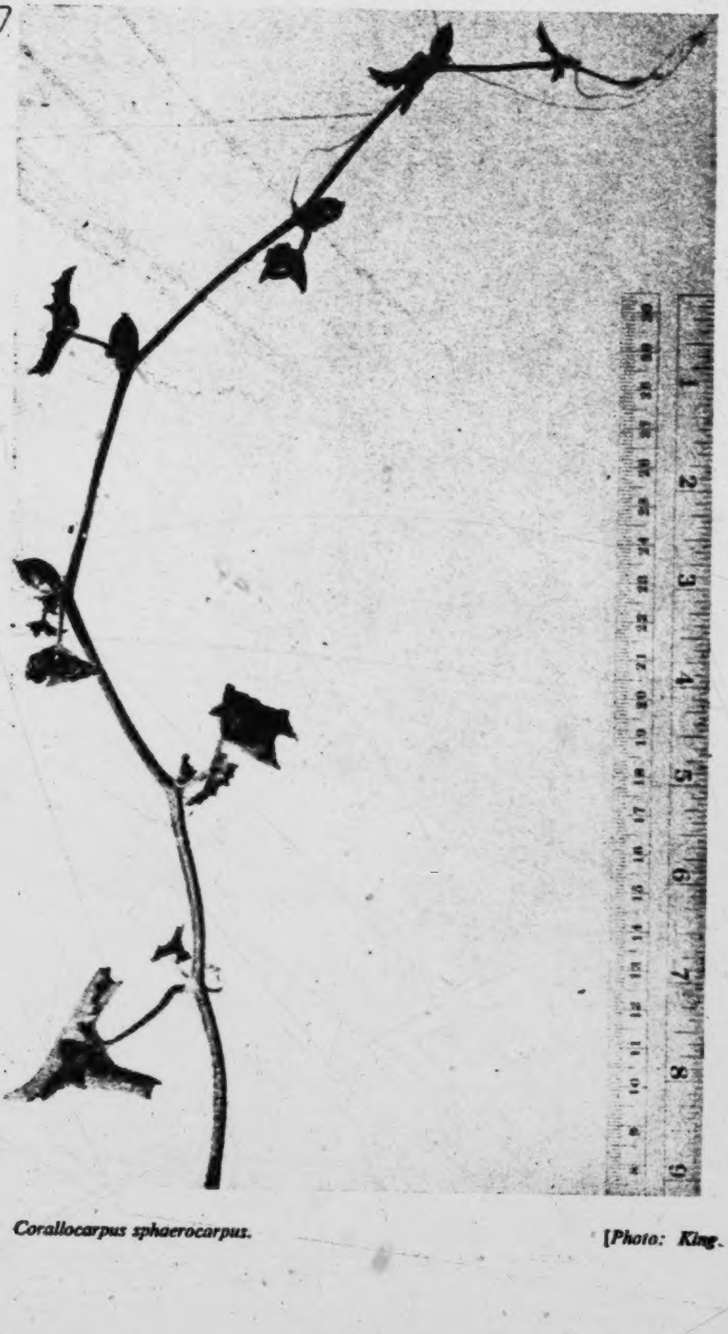

53. *Corallocarpus sphaerocarpus.* [*Photo: King.*

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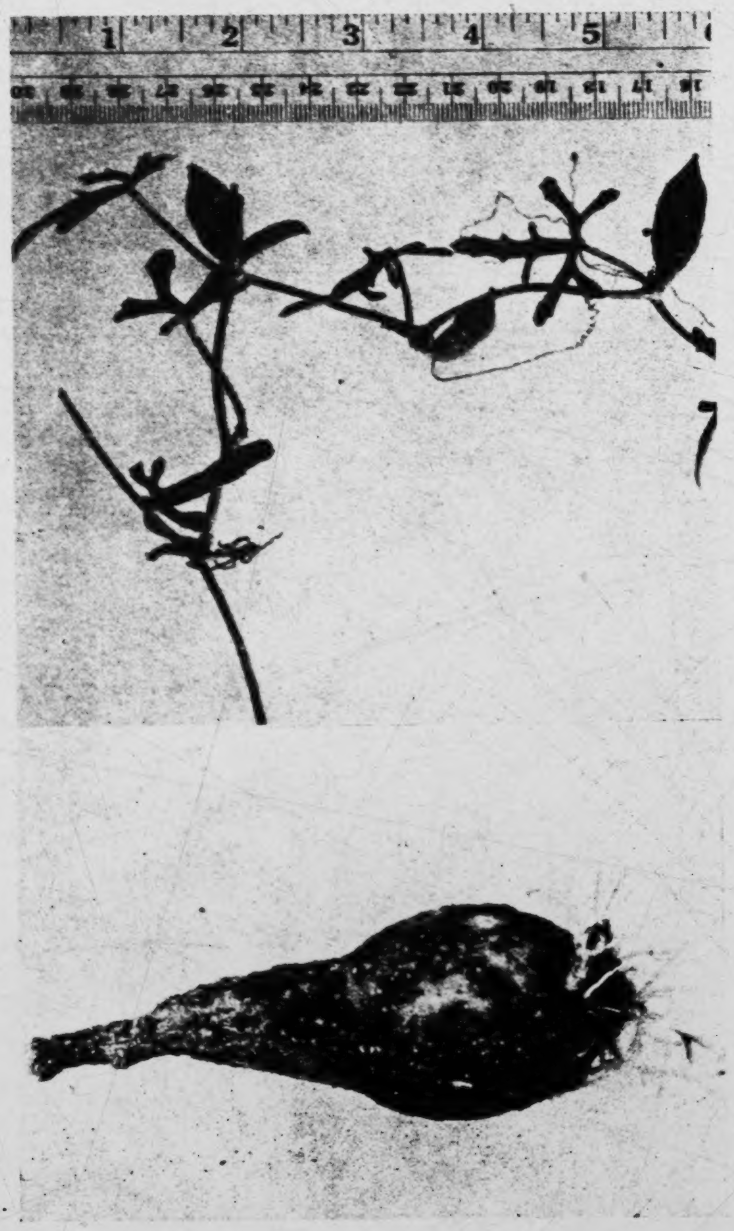

54. *Corallocarpus welwitschii.* [*Photo: King*

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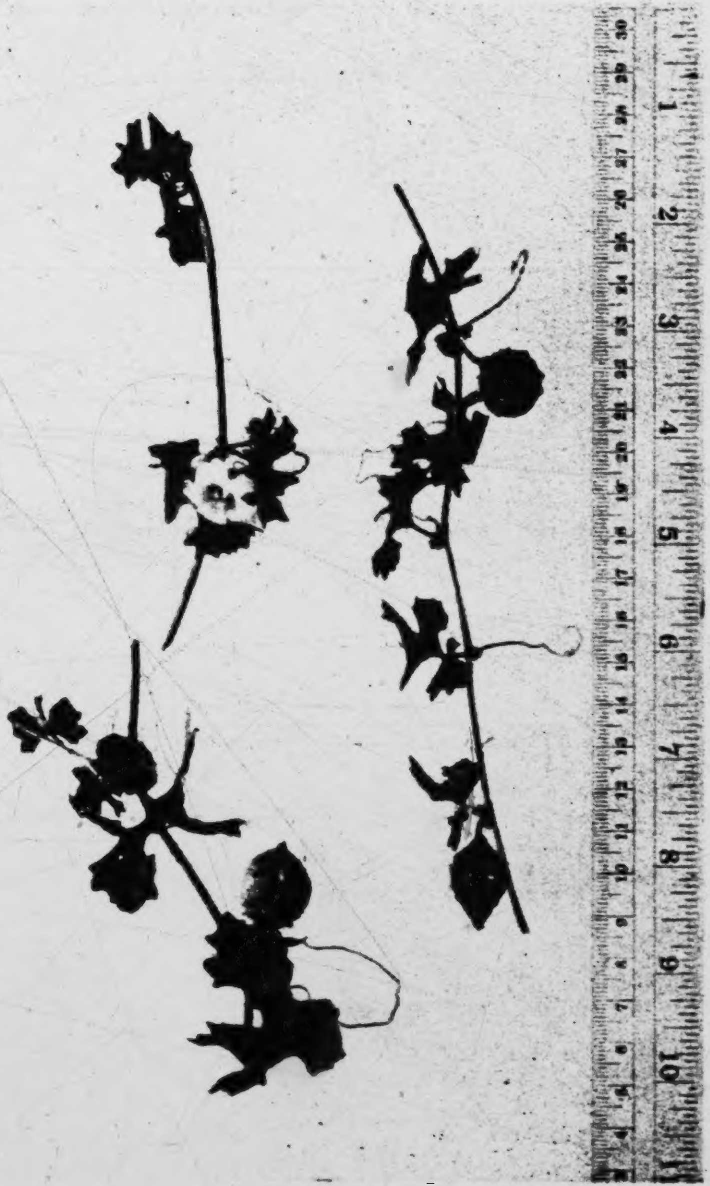
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55. *Momordica balsamina.* [*Photo:* *King*.

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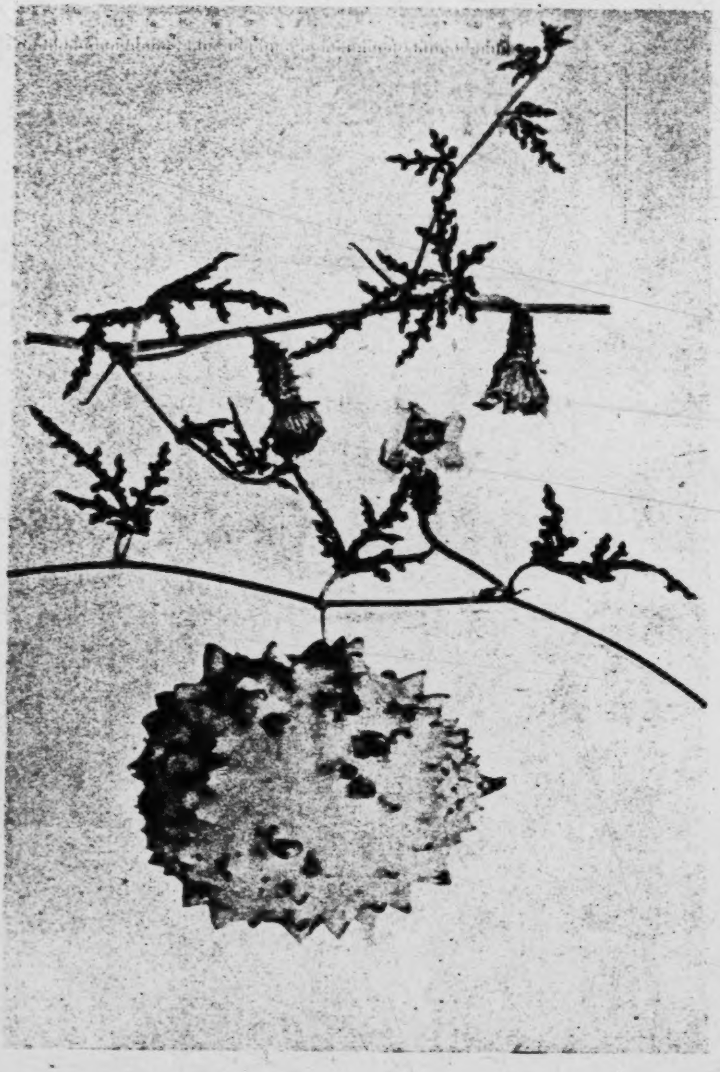

56. *Citrullus naudinianus.* [*Photo: Reyburn.*

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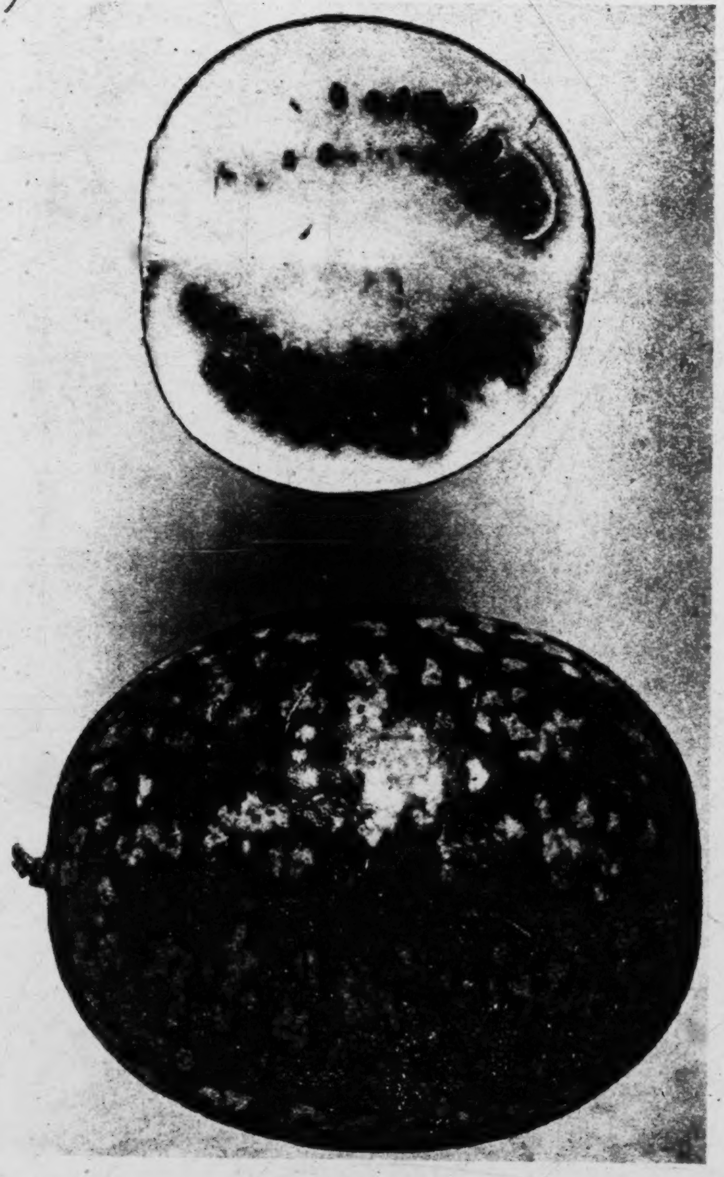

57. *Citrullus vulgaris* — Two-thirds natural size. [*Photo: Reyburn.*

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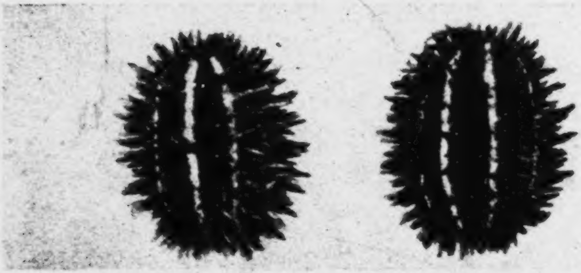
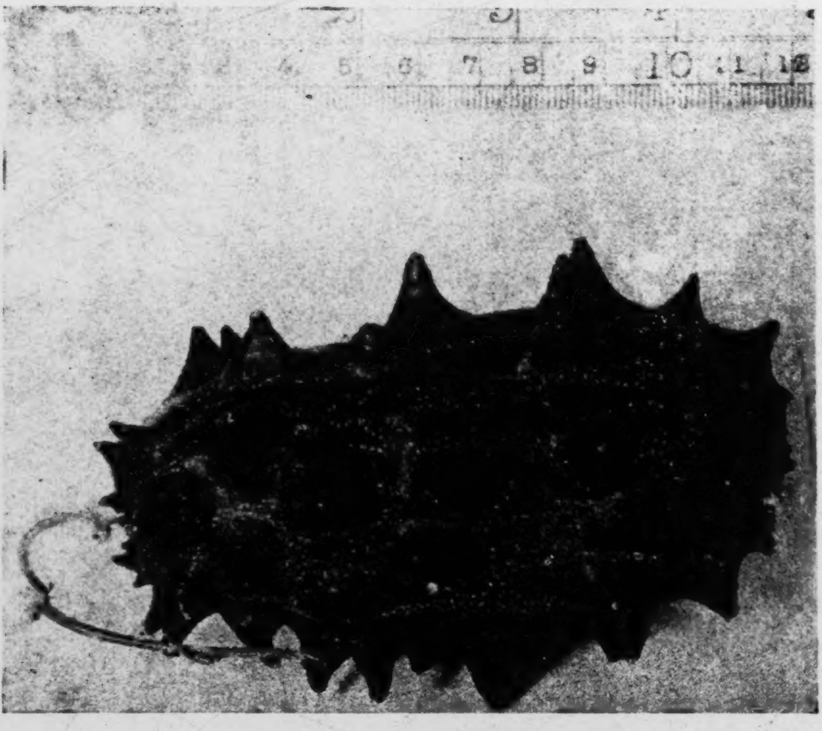


58. *Cucumis hookeri* — Natural size. [*Photo: King.*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59. *Cucumis metuliferus.* [*Photo: King*

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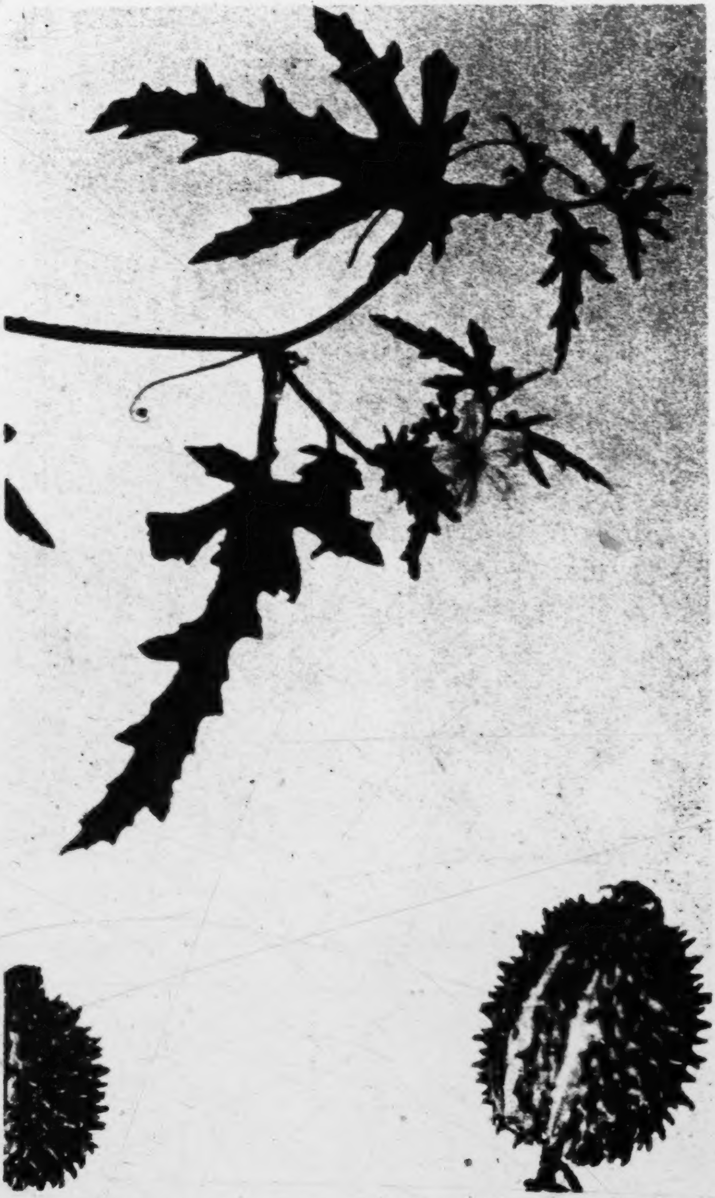

60. *Cucumis* sp. — Natural size. [*Photo: King.*

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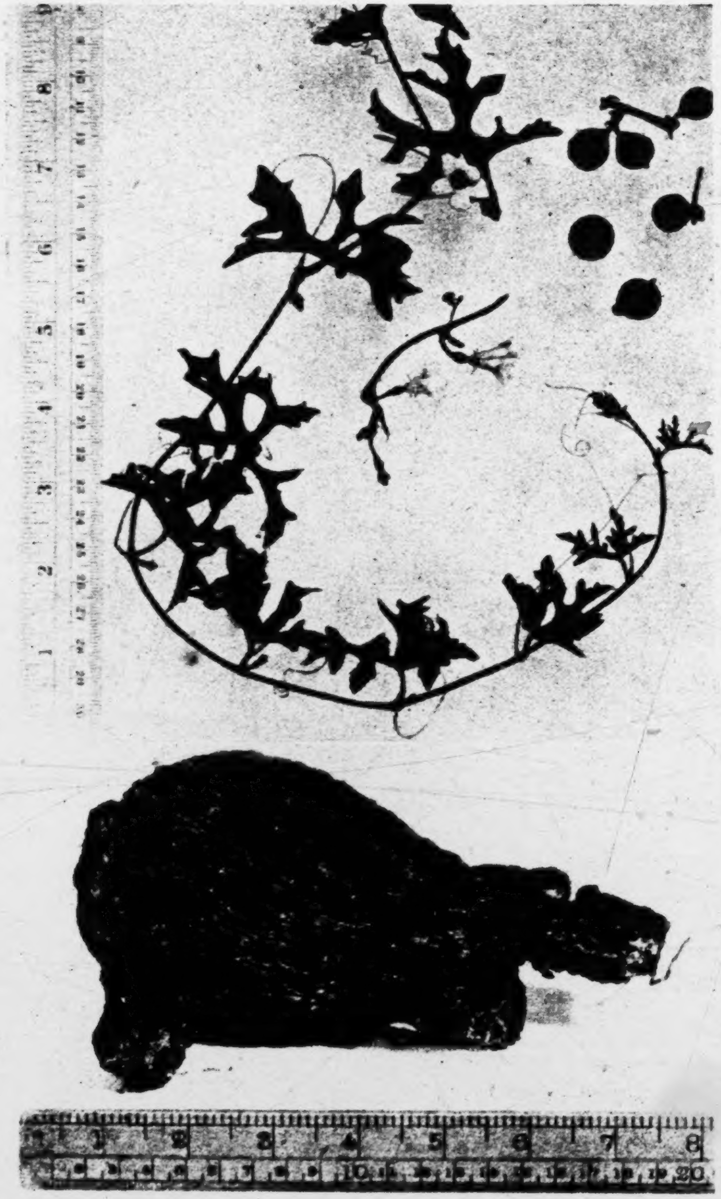

61. *Coccinia rehmannii.* [*Photo: King.*

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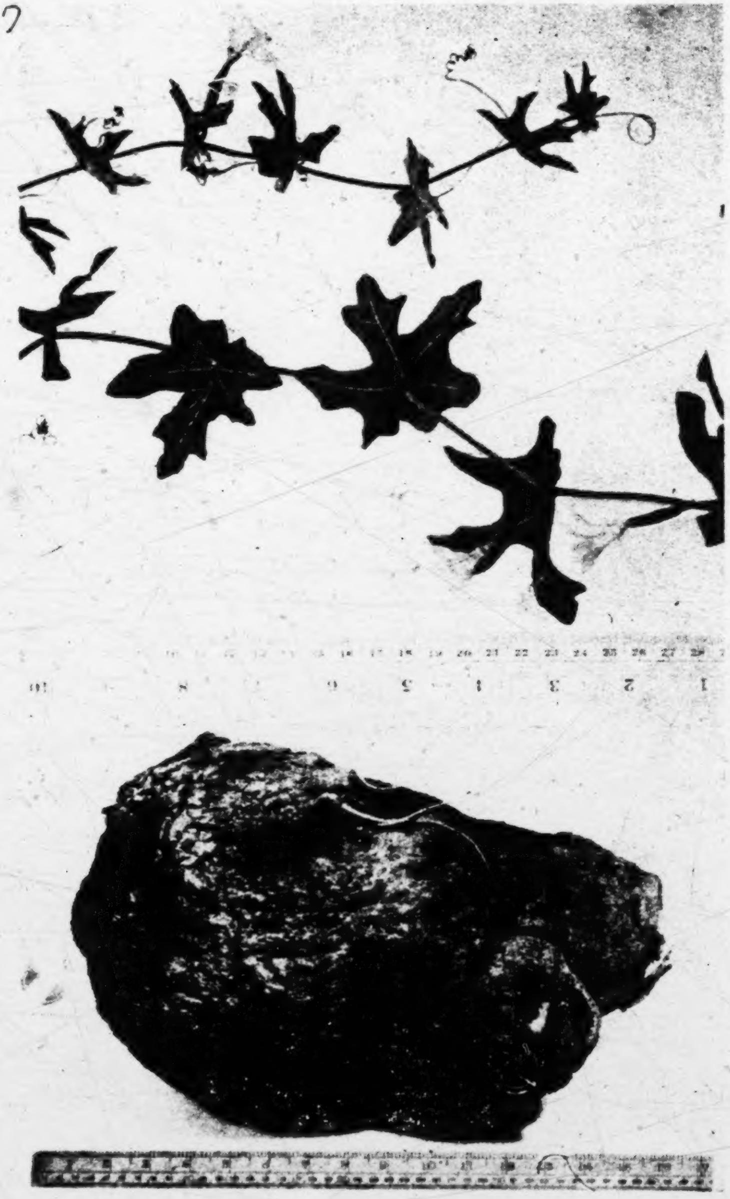

62. *Coccinia sessilifolia* [*Photo:* *King.*

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